HPCL MT

Mechanical Engineering

Mega Mock Challenge
(August 5th - August 6th 2021)

Questions & Solutions

1. Select the correctly spelt word.
    A. intrepid   B. actuetion
    C. inoeculete   D. ominoeus

Ans. A

Sol. Option A has correctly spelt word i.e. 'intrepid' which means 'invulnerable to fear or intimidation'.

Actuation = the act of propelling.

Inoculate = introduce an idea or attitude into the mind of.

Ominous = indicating evil intent or suggesting tragic developments.

2. Which one of the following is the synonym of the word written in capital letters in the sentence, "The government's decision to raise taxes has caused a great FURORE"?
    A. Worry   B. Trouble
    C. Fury   D. Flux

Ans. C

Sol. Let's understand the meaning of the given words: -

Furore = a sudden expression of excitement or anger by a lot of people, esp. in reaction to something.

Worry = to make someone feel unhappy and frightened.

Trouble = problems or difficulties.

Fury = Extreme anger

Flux = the action or process of flowing or flowing out.

Hence, option C is the correct answer.

3. Common
    Select the most appropriate antonym of the given word.
    INFINITY
    A. perpetual   B. detrimental
    C. infinitude   D. limited

Ans. D

Sol. Let's first see the meaning of the given words.

Infinity = time without end

e.g. The ocean seemed to stretch over the horizon into infinity.

Perpetual = continuing forever or indefinitely

Detrimental = causing harm or injury

Infinitude = an infinite quantity

Limited = small in range or scope

e.g. Book early because there are only a limited number of seats available

Hence, option C is the correct answer.

4. Common **Read the following passage and answer the questions that follow.**

    In September 2011, Hindustan Times did a study in Delhi and reported that the number of malaria (and dangue) cases at the time were actually thrice as many as revealed by the city authorities. Earlier, in Mumbai, a municipal claim that 145 people died due to malaria in 2010 were exposed a lie after Praja, a city NGO, extracted figure from the municipality itself.Following an RTI petition, Praja revealed 1190 deaths. This seems to be a habit. A paper in leading UK medical journal The Lancet, published following nationwide interviews undertaken by an international team, reveals that the number of malarial deaths all over India every year may be as high as 205,000,which is manytimes the World Health Organization's figure of about 15,000, of the National Vector Borne Disease Control Programme's figure of just around 1000.

    Which The Lancet paper has been disputed, it is clear that there must be gross under-reporting of malaria deaths. Wouldn't that one of the big reasons why malaria, which is easily cured if properly treated after timely diagnosis, continues to kill so many Indians?

    End

    The Hindustan Times found that the number of malaria cases in 2011 was

    A. three times the numbers revealed by the authorities

    B. exactly as the numbers revealed by the authorities

    C. half the numbers revealed by the authorities

    D. twice than the numbers revealed by the authorities

Ans. A

Sol. The passage mentions "In September 2011, Hindustan Times did a study in Delhi and reported that the number of malaria (and dangue) cases at the time were actually thrice as many as revealed by the city authorities". Thrice means "three times".

     Hence, **option A** is the correct answer.

5. The findings of the Lancet were published after

    A. proper verifications of the findings were done

    B. nationwide interviews were carried out

    C. the intertnational team left India

    D. international reviews of the findings were done

Ans. B

Sol. The passage mentions, "A paper in leading UK medical journal The Lancet, published following nationwide interviews". It means the paper published reports based on the interviews.

     Hence, **option B** is the correct answer.

6. What is "the habit" mentioned in the passage?

    A. exposing the authority's incompetence

    B. conducting studies and surveys in towns and cities

    C. hiding the real figures of malaria cases

    D. filing RTIs

Ans. C

Sol. The former lines in the passage talks about how the authorities keeps hiding the real figures. And in the very next line the word "habit" is mentioned. Thus we can understand that this "habit" refers to that hiding of information.

Hence, **option C** is the correct answer.

7. Common **The given sentence is given in comparative degree. Change its degree to positive and select the correct option.**

    He is taller than his brother.A. His brother is the tallest to him.

    B. His brother is not as tall as he is.

    C. His brother is as tall as he is.

    D. His brother is as tall if not taller than himself.

Ans. B

Sol. The given sentence is of comparative degree. It would be written in normal degree as;

    "His brother is not as tall as he is."

8. Common

    Identify the best way to improve the underlined part of the given sentence. If there is no improvement required, select 'no Improvement'.

    End

    Rajesh is <u>not very-well</u> these days.

    A. in poverty   B. unwell

    C. indifferent   D. No Improvement

Ans. B

Sol. The word 'unwell' is generally used to refer to somebody who is not well.

    Hence, option B is correct.

9. **Directions:** *In the following questions, a part of the sentence is printed in **bold**. Below are given alternatives to the **bold** part at A., B., C. which may improve the sentence. Choose the correct alternative. In case no improvement is needed your answer is D.*

    My opinion of the play is that it will win the National award.

    A. opinion to   B. opinion about

    C. opinion on   D. No improvement

Ans. B

Sol. Here. My opinion about… should be used.

10. Common

   Identify the best way to improve the underlined part of the given sentence. If there is no improvement required, select 'no Improvement'.

   End

   Out basketball team <u>play badly</u> last Friday.

   A. plays badly   B. played bad

   C. played badly   D. No improvement

Ans. C

11. Common

   Select the most appropriate idiom (in the context) to fill in the sentence.

   End

   In modern democratic societies _____ seems to have become a common feature in almost all the spheres of life.

   A. lose touch   B. lynch law

   C. make ends meet   D. neck of the woods

Ans. B

Sol. The idiom "lynch law" means the punishment, especially death, upon a suspected, accused, or convicted person by a mob acting without legal authority. Hence, option B is the correct answer.

12. Common

   Select the most appropriate meaning of the idiom underlined in the sentence.

   End

   Those persons who are ready <u>to sail close</u> to the wind can be successful in life.

   A. to take risk   B. to manage the situation

   C. to work hard   D. to be regular

Ans. A

Sol. The idiom "to sail close to the wind" means to do something that is dangerous, risky. Thus, option A defines the meaning of the idiom correctly.

13. Common

   Select the most appropriate idiom (in the context) to fill in the sentence.

   End

   Yesterday, someone _____ and stole Aman's radio.

   A. broke off   B. broke through

   C. broke in   D. broke away

Ans. C

Sol.

Let's first learn the idioms and the phrases given in the options:

Break in = enter a place by force or illicit means.

Break away = leave suddenly/ become separated, literally or figuratively.

Break off = End a relationship/ to become separate.

Break through = to make new and important discoveries.

Hence, option C is the correct answer.

14. Common

    Directions: In the following questions, some of the sentences have error. Find out which part of a sentence has an error. The number of that part is your answer. If there is no error, your answer is (4) i.e. No error.

    End

    You'd better (1)/ gone now, (2)/ or you'll be late. (3)/ No error (4)

    A. Sentence 1   B. Sentence 2

    C. Sentence 3   D. No Error

Ans. B

Sol. The error is in the second part of the statement. 'Gone' needs to be replaced with 'go'.

15. Common **In the sentence, identify the segment which contains the grammatical error. If the sentence has no error, then select 'No error'.**

    Many a student have passed the I.I.T. examination this year.

    A. the IIT examination   B. Many a student have

    C. this year   D. No Error

Ans. B

Sol. Option B has the grammatically incorrect part. The phrase 'many a student' certainly gives a plural sense but it is followed by a singular verb.

    e.g. *Many a* tale was told.

    Hence, 'has passed' should be used in place of 'have placed'.

16. Common

    In the sentence identify the segment which contains the grammatical error. If the sentence has no error, then select 'No error'.

    End

    Rina was trying for admission in the Engineering College even though her parents wanted her to take up medicine.

    A. trying for admission in the Engineering

    B. even though her parents

    C. wanted her to take up

    D. No Error

Ans. D

Sol. The given sentence is grammatically correct.

"Try for something" is a phrasal verb which means to try to get something. Also, the use of the preposition "in" with "admission" is also correct.

17. Common

Choose the most appropriate option to change the narration (direct/indirect) of the given sentence.

End

He said that he had been waiting there for a long time.

A. He said, "I have been waiting here for a long time."

B. He said, "He has been waiting here for a long time."

C. He said, "He has been waiting there for a long time."

D. He said, "I am waiting here for a long time

Ans. A

Sol. This is a statement of indirect narration and we will change it to direct narration accordingly. The tense conversion rule which applies here is that past perfect continuous will be changed to the present perfect continuous and vice versa and here changes to there and vice versa. He will be changed to I as first-person pronoun changes according to the subject of the reporting speech. Only option A follows the set of rules. Hence, option A is the correct answer.

18. Common

Select the most appropriate option to fill in the blank.

End

The Supreme Court of India is hearing an appeal lodged on behalf of Rohingya against the deportation plan _____

A. planned by the Muslims of the country

B. proposed by the Prime minister of the country

C. announced by China earlier

D. done in Myanmar

Ans. B

Sol. Since it is mentioned that the country is India option C and D are incorrect and illogical. Since the sentence includes a legal action option A is illogical. Thus B is the correct answer.

19. Which one of the following prepositions may be used in the blank space in the sentence, "Most children remain _____ school between the ages of seven and ten."?

A. in   B. under

C. at   D. inside

Ans. A

Sol. The correct preposition is 'in'.

Note: We use both "in" and "at" prepositions with school but in different situations.

In - is used when the person is studying in school in general.

At - is used when the person is literally, physically, inside the school.

Hence, option A is the correct answer.

20. Common

Select the correct indirect form of the given sentence.

End

"Don't play on the grass, boys?" she said.

A. She ordered the boys saying don't play on the grass.

B. She said to the boys that they should not play on the grass

C. She told the boys that they should not be playing on the grass.

D. She told the boys not to play on the grass.

Ans. D

Sol.

This is an imperative sentence. In such sentences, order, request, advice or negative command is given. In negative command like in the given sentence, the reported speech starts with Do not or Don't. In the given sentence, "said" will change to "told". The reporting and reported speech will be joined by "not to". Thus, the indirect speech of the given sentence would be "She told the boys not to play on the grass".

Hence, option D is the correct answer.

21. Common

Directions: In the following questions, the first and the last part/sentence of the sentence/group of sentence are numbered 1 and 6. The rest of the sentence is split into four parts and named P, Q, R and S. These four parts are not given in their proper order. Read the sentence and find out which of the four combinations is correct. Then find the correct answer.

End

1: The time has come for us to consider seriously the question of a Bharat brand of English.

P: I am not suggesting here a mongrelisation of the language.

Q. But the idea is to incorporate the indigenous crisp of the language with the sophisticated rules.

R: Now the time is ripe for it to come to the dusty street, marketplace and under the banyan tree.

S: So far English has had a comparatively confined existence in our country, chiefly in the

halls of learning, justice, or administration.

6: Bharat English will respect the rule of law and maintain the dignity of grammar, but still have a Swadeshi stamp on it.

A. QPSR
B. SRQP

C. RQSP
D. SRPQ

Ans. D

Sol. The correct sequence is SRPQ.

S should be the first statement as it continues the idea established in statement 1, which is of the Indianisation of the language. R is automatically the next statement as it takes the idea forward. PQ is a mandatory pair as both the statements in a way are complimentary to each other.

22. Common **Direction:** Given below is a famous saying the words of which have been jumbled up and numbered. Choose the right order from the given options.End

the tough (1)/ gets tough (2)/ when the (3)/ going (4)/ get going (5)

A. 52314
B. 14235

C. 24351
D. 34215

Ans. D

Sol. The correct sequence is 34215 as the proverb is "when the going get tough, the tough get going."

23. Common

Select the most appropriate option to fill in the blank.

End

All octopuses are venomous, but only the blue-ringed octopuses are _____ to be deadly to humans.

A. know
B. knew

C. knowing
D. known

Ans. D

Sol. The given sentence needs an **adjective**. Out of the given alternatives, only '**known**' is the correct choice. It is used for someone who is recognized, familiar, or within the scope of knowledge.

e.g. It is a **known** fact that he started out a poor man.

Hence, option D is the correct answer.

24. Common In the following question, a sentence has been given in Active/Passive Voice. Out of the four alternatives suggested, select the one which best expresses the same sentence in Passive/Active Voice. End

Has the price rise affected all the people?

A. Have all the people been affected by the price rise?

B. Are all the people being affected by the price rise?

C. Had all the people being affected by the price rise?

D. Are all the people affected by the price rise?

Ans. A

Sol. The given sentence is of present perfect tense and it is interrogative form. The structures for active/passive voices for such sentences would be:

Active: Has/have +subject + verb (IIIrd form) + object...

Passive: Has/have + Object + been + verb (IIIrd form) + by + subject...

So, the passive voice of the given sentence would be:

Have all the people been affected by the price rise?

25. Common

Direction: In the sentence, identify the segment which contains the grammatical error. If the sentence has no error, then select 'No error'.

End

She had offered a temporary assignment but she turned it down saying that she would accept only a permanent one.

A. She had offered

B. a temporary assignment but

C. she turned it down saying that

D. No error

Ans. A

Sol. Option A has the grammatically incorrect part. A passive voice should be used here. When we want to focus on the person or thing affected by the action, we make the person or thing the subject of the sentence and use the passive voice. Hence, replace 'she had offered' by 'she had been offered'.

Look at the sentence:

I had offered her ..... but she turned .... down... (Active voice)

She had been offered .... but she turned .... down... (Passive voice)

26. **Select the INCORRECTLY spelt word.**

A. guarantee   B. athelete

C. convenience   D. dilemma

Ans. B

Sol. The incorrectly spelt word is "Athelete" and the correct spelling is "Athlete" which means Sportsperson

Let's understand the meaning of other words:

Convenience: something that makes things easier

Dilemma: problem or puzzle

Hence, option B is the correct answer.

27. Identify the incorrect pair:

    A. Maverick : Bohemian   B. Temperamental : Mercurial

    C. Clumsy : Gawky   D. Magnanimous : Malady

Ans. D

Sol. Let's first see the meanings of the words:

Maverick is a person who does not behave or think like everyone else, but who has independent, unusual opinions. Bohemian is its synonym.

Temperamental is someone whose mood often changes very suddenly. Mercurial is its synonym.

Clumsy is someone who is careless and likely to knock into, drop or break things. Gawky is its synonym.

Magnanimous is someone who is generous or forgiving, especially towards a rival or less powerful person. Malady is a disease or ailment or a serious problem.

Hence, option D is the correct answer.

28. **Select the incorrectly spelt word.**

    A. caffeine   B. decaffeineted

    C. marathon   D. alcoholic

Ans. B

Sol. Option B has the incorrectly spelt word. Its correct spelling is Decaffeinated. It means to have coffee or tea after having most of the caffeine removed.

Other words and their meanings:

Caffeine = an alkaloid compound which is found especially in tea and coffee plants and is a stimulant of the central nervous system.

Marathon = a long-distance running race, strictly one of 26 miles.

Alcoholic = containing or relating to alcohol.

29. Find The No. of prime factor of $(56)^{20} \times (36)^{31} \times (42)^{13} \times (13)^{21}$

    A. 240   B. 242

    C. 264   D. 248

Ans. C

Sol. $(56)^{20} \times (36)^{31} \times (42)^{13} \times (13)^{21}$

$\Rightarrow (2 \times \underline{2} \times \underline{2} \times \underline{7})^{20} \times (2^2 \times \underline{3}^2)^{31} \times (\underline{2} \times \underline{3} \times \underline{7})^{13} \times (13)^{21}$

$\Rightarrow (2^3 \times 7)^{20} (2^{62}) \times (3)^{62} \times (\underline{2} \times \underline{3} \times \underline{7})^{13} \times (13)^{21}$

$\Rightarrow 2^{60} \times 7^{20} \times 2^{62} \times 3^{62} \times 2^{13} \times 3^{13} \times 7^{13} \times 13^{21}$

$\Rightarrow 2^{60+62+13} \times 3^{62+13} \times 7^{20+13} \times 13^{21}$

$\Rightarrow 2^{135} \times 3^{75} \times 7^{33} \times 13^{21}$

Number of prime factors:

= 135 + 75 + 33 + 21 = 264

30. A sum of money is to be divided among four persons in the ratio 9 : 11 : 13 : 15. Out of the four, How many persons gets Rs.200 more than the other and Rs.100 less than the other. and What is the sum?

A. C, Rs.1700

B. C, Rs.2400

C. B & C, Rs.4600

D. B, Rs.1500

Ans. B

Sol. Let the persons be A, B, C, and D and the share of all four persons be 9x, 11x, 13x, and 15x respectively

Total sum = 9x + 11x + 13x + 15x = 48x

If we look into the options and we can see that option B has amount = 2400 which is a multiple of 48 so we will use hit & trial method here and will try to satisfy the question

9x + 11x + 13x + 15x = 2400

⟹48x = 2400

⟹x = 2400/48 = 50

• So the respective shares of all four persons A, B, C and D is Rs.450, Rs.550, Rs.650, and Rs.750

• The required amount is Rs.2400

31. $\dfrac{0.125 + 0.027}{0.25 - 0.15 + 0.09}$ is equal to:

A. 0.3

B. 0.5

C. 0.8

D. 0.9

Ans. C

Sol.

$$\frac{0.125+0.027}{0.25-0.15+0.09} = \frac{0.152}{0.19} = 0.8$$

Hence Option C is correct.

32. If 35% are the passing marks. A student gets 200 marks yet fails by 24 marks. What is the maximum marks?

A. 820

B. 550

C. 640

D. 680

Ans. C

Sol. 35% → 200 + 24

$$100\% \rightarrow \frac{224}{35} \times 100$$

∴ Maximum marks = 32 × 20 = 640 .

33. Find the greatest number which divides 99, 123 and 183 leaving the same remainder in each case.

A. 11

B. 12

C. 13

D. 14

Ans. C

Sol. Let x be the remainder Then (99 - x), (123 - x) and (183 – x) will be exactly divisible by the required number. As discussed under division method of HCF any number which divides the given numbers, also divides their difference. In other words. HCF of given numbers is same as the HCF of their difference.

∴ Required number

= HCF of (123 - x) - (99 - x),

(183 – x) – 911=23 – x) and (183 – x) – (99 – x)

HCF of (123 – 99), (183 – 123) and (183 – 99)

= HCF of 24, 60 and 84

Now, 24 = 2 × 2 × 2 × 3

60 = 2 × 2 × 3 × 5

84 = 2 × 2 × 3 × 7

∴ required HCF = 2 × 2 × 3 = 12

∴ Required number = 13

34. A sum of Rs 819 is to be divided among three friends A, B and C such that $\dfrac{A's\ share}{B's\ share} = \dfrac{B's\ share}{C's\ share} = \dfrac{5}{6}$. Find the share of B?

A. 180

B. 360

C. 270

D. 450

Ans. C

Sol.

$$\frac{A's\ share}{B's\ share} = \frac{B's\ share}{C's\ share} = \frac{5}{6}$$

A : B = 5 : 6

B : C = 5 : 6

Then A : B : C = 25 : 30 :36

(25 + 30 + 36) X = 819

91 X = 819

X = 9

Required ans = 30 × 9 = 270

35. If A, B, C, D are angles of a cyclic quadrilateral, then cos A + cos B + cos C + cos D
is equal to

A. 1   B. 2cos A

C. -1   D. 0

Ans. D

Sol. ∴ As the opposite angles of a cyclic quadrilateral are supplementary,

∴ A+C=B +D = 180°

$$\therefore \cos A = \cos(180^o - C) = -\cos C$$

$$\cos B = \cos(180^o - D) = -\cos D$$

$$\therefore \cos A + \cos B + \cos C + \cos D$$

$$= \cos A + \cos B - \cos A - \cos B = 0$$

36. The average age of 40 students of a class is 16 years. If the average age of 24 students
is 15½ years and that of the 15 students is 16⅔ years, then the age of 40th student is-

A. 17   B. 16

C. 16.5   D. 18

Ans. D

Sol. Given: The average age of 40 students of a class is 16 years.

The sum of ages of these students = 40 × 16

= 640

Now, if the average age of 24 students is 15½ years and that of the 15 students is
16⅔ years, then the age of 40th student = 640 – [(31/2) × 24 + (50/3) × 15]

= 640 – [372 + 250]

= 18 years

37. A man covers a total distance of 100 km on bicycle. For the first 2 hours, the speed was
20 km/hr and for the rest of the journey, it came down to 10 km/hr. The average speed
will be

A. $12\frac{1}{2} km / hr$ B. 13 km / hr

C. 15 1 / 8 km / hr   D. 20 km / hr

Ans. A

Sol. A man covers a total distance of 100 km on bicycle. For the first 2 hours, the speed was 20 km/hr and for the rest of the journey, it came down to 10 km/hr.

In the first 2 hours, distance covered = 20 × 2 = 40 km

Remaining distance = 100 − 40 = 60km

Time required to cover this remaining distance = 60/10 = 6hr

Now total time taken to complete the total distance = 2 + 6 = 8hr

Average speed = Total distance/total time = 100/8 = $12\dfrac{1}{2}$ km / hr

38. A retailer offers the following discount schemes for buyers on an article.

I. Two successive discounts of 10%.

II. A discount of 12% followed by a discount of 8%.

III. Successive discounts of 15% and 5%,.

IV. A discount of 20%.

The selling price will be minimum under the scheme

A. I   B. II

C. III   D. IV

Ans. D

Sol. Single equivalent discount

$$= \left(10 + 10 - \dfrac{10 \times 10}{100}\right)\% = 19\%$$

II. Single equivalent discount

$$= \left(12 + 8 - \dfrac{12 \times 8}{100}\right)\% = 19.04\%$$

III. Single equivalent discount

$$= \left(15 + 5 - \dfrac{15 \times 5}{100}\right)\% = 19.25\%$$

Clearly, selling price is minimum under the discount of 20%.

39. The ratio of the fifth and sixth terms of the sequence 1, 3, 6, 10, ………… is:

A. 5 : 6   B. 5 : 7

C. 7 : 5   D. 6 : 5

Ans. B

Sol. The pattern of the sequence is:

1 + 2 = 3

3 + 3 = 6

6 + 4 = 10

10 + 5 = 15

15 + 6 = 21

Thus, sequence = 1, 3, 6, 10, 15, 21, 28, ...

Required ratio

= 15 : 21 = 5 : 7

40. Two pipes X and Y can fill a tank in 36 min and 45 min, respectively. A waste pipe Z can empty the tank in 30 min. First X and Y are opened. After 7 min, Z is also opened. In how much time, the tank is full?

A. 54 min   B. 64 min

C. 46 min   D. 36 min

Ans. C

Sol. Part filled in 7 min $= 7 \times \left[\dfrac{1}{36} \times \dfrac{1}{45} \right] = \dfrac{7}{20}$

Remaining part $= \left[1 - \dfrac{7}{20} \right] = \dfrac{13}{20}$

Part filled by $(X + Y + Z)$ in 1 min $= \left[\dfrac{1}{36} + \dfrac{1}{45} - \dfrac{1}{30} \right] = \dfrac{1}{60}$

Now 1/60 part is filled by them in 1 min

13/20 part will be filled in $\left[\dfrac{60 \times 13}{20} \right] = 39 \, min$

∴Total time taken to fill the tank = 39 + 7 = 46 min.

Alternate Method:

Let total capacity of Tank = LCM of (36,45,30) = 180 units

A   36 min   5

B   45 min   4

Z   30 min   -6

Tank filled in 7 min = (5+4) x 7 = 63 units

Now efficiency of all three pipes = 5 + 4 - 6 = 3

Time taken to fill remaining tank = (180 - 63)/3 = 39 min

Thus, total time taken to fill the tank = 39 + 7 = 46 min.

41. A began a business with rupees. 45 lakh and was joined afterwards by B with rupees. 30 lakh. When did B join if the profits at the end of the year were divided in the ratio 2:1?

A. after 3 months   B. after 4 months

C. after 8 months   D. after 6 months

Ans. A

Sol.

$$\frac{45 \times 12}{30 \times t} = \frac{2}{1}$$

t = 9 months

that means B joined after 3 months.

42. A certain sum of money at simple interest amounts to Rs. 1012 in 2.5 years and to Rs. 1067.20 in 4 years. The rate of interest per annum is

A. 2.5%   B. 3%

C. 4%   D. 5%

Ans. C

Sol. If the principal be Rs. P and rate of interest by r% p.a. then

$$1012 = P + \frac{P \times r \times 5}{100 \times 2} \quad............(ii)$$

Interest in 3/2 years (difference between 4 years and 2.5 years)

= 1067.20 – 1012 = Rs. 55.20

$$\therefore P = \frac{55.20 \times 100}{\frac{3}{2} \times r} = \frac{3680}{r}$$

From equation (i),

$$1012 = \frac{3680}{r} + \frac{3680 \times 5}{200}$$

$$\Rightarrow 1012 = \frac{3680}{r} + 92$$

$$\Rightarrow \frac{3680}{r} = 1012 - 92 = 920$$

$$\Rightarrow r = \frac{3680}{920} = 4\% \; per \; annum$$

43. Cartons numbered 1, 2, 3, 4, 5 and 6 are kept in a row and they are to be filled with either a yellow or a green cubes, such that no two adjacent cartons can be filled with green cubes then, how many different arrangements are possible if all cubes of a given color are exactly identical in all respects?

A. 54   B. 59

C. 58   D. 49

E. 44

Ans. D

Sol. Total number of ways of filling the 6 cartons numbered as (1, 2, 3, 4, 5 and 6) with either yellow or green cubes = 2^6

⇒ Total number of ways of filling the 6 cartons numbered as (1, 2, 3, 4, 5 and 6) with either yellow or green cubes = 64

Two adjacent cartons with green cubes = (12), (23), (34), (45) and (56).

⇒Two adjacent cartons with green cubes can be got in 5 ways

Three adjacent cartons with green cubes = (123), (234), (345) and (456).

⇒Three adjacent cartons with green cubes can be got in 4 ways

Four adjacent cartons with green cubes = (1234), (2345) and (2456).

⇒Four adjacent cartons with green cubes can be got in 3 ways

Five adjacent cartons with green cubes = (12345) and (23456)

⇒Five adjacent cartons with green cubes can be got in 2 ways

Six adjacent cartons with green cubes = (12346)

⇒Six adjacent cartons with green cubes can be got in 1 ways

∴The total number of ways of filling the cartons such that adjacent cartons have green cubes = (5 + 4 + 3+ 2+1) =15

Now, the number of ways for filling up the cartons such that no two adjacent cartons have green cube = 64 -15 = 49

44. $(16)^{0.16} \times (16)^{0.04} \times (2)^{0.2}$ is equal to

A. 1   B. 2

C. 4   D. 16

Ans. B

Sol. $(16)^{0.16} \times (16)^{0.04} \times (2)^{0.2} = (2^4)^{0.16} \times (2^4)^{0.04} \times (2)^{0.2}$

$= 2^{0.64} \times 2^{0.16} \times (2)^{0.2} = (2)^{0.64+0.16+0.2} = 2$

45. A car takes 5 hours to cover 100 kms distance at a particular speed whereas another car takes 3 hours to reach a particular distance at the same speed. Find the distance travelled by the second car.

A. 40 km   B. 60 km

C. 70 km   D. 80 km

Ans. B

Sol. Given: first car takes 5 hours to cover 100 kms distance

Speed of first car = 100/5

= 20 km/hr

This is the speed of the other car.

Distance travelled by the second car in 3 hrs with this speed = 3 × 20

= 60 km

46. Ankit has a specific average for 8 innings. In the ninth innings, he scores 113 runs in this manner his average increases by 11 runs. His new average is:

A. 17   B. 14

C. 21   D. 25

Ans. D

Sol. Let's Assume Ankit's average be x for 8 innings.

So, Ankit scored 8x run in 8 innings.

In the 9th inning, he scored 113 runs then average become (x+11). And he scored (x+11)*9 runs in 9 innings.

Now,

⇒ 8x+113 = 9*(x+11)

Or, 8x+113 = 9x+99

Or, x = 113-99

Or, x = 14

New average = (14+11) = 25 runs.

47. A right circular cone is exactly fitted inside a cube in such a way that the edge of the base of the cone are touching the edge of one of the face of the cube and the vertex is on the opposite face of the cube. If the volume of the cube is 343 cm^3, what approximately is the volume of the cone?

A. 80 cm^3

B. 90 cm^3

C. 110 cm^3

D. 105 cm^3

Ans. B

Sol. Edge of the cube = $(343)^{1/3}$ = 7 cm

Radius of the cone = 3.5 cm

Height = 7 cm

Volume of cone = $(1/3) \times \pi \times r^2 \times h$

= $(1/3) \times (22/7) \times 3.5 \times 3.5 \times 7$

= $(1/3) \times 22 \times 12.25$

= 89.8333 ≈ 90 cm^3

48. P and Q can do a project in 12 and 12 days respectively. In how many days can they complete 50% of the project if they work together?

A. 6 days

B. 3 days

C. 18 days

D. 1.5 days

Ans. B

Sol. Sol. Let total work be 12 units.

Given: P and Q can do a project in 12 and 12 days respectively.

Then, efficiency of P = efficiency of Q = 1 unit/day

Now, to finish 50% of the total work, i.e. 6 units, they will take = 6/(1+1) = 3 days

49. Ravi is 12 years younger than Surya. Ravi's age is 40% of the sum of his and Surya's age. What will be Surya's age 9 years later?

A. 36

B. 24

C. 33

D. 45

E. None Of These

Ans. D

Sol. Let the age of Ravi and Surya be x and y respectively.

A.T.Q.

$$\frac{x}{x+y} = \frac{2}{5}$$

x : y = 2 : 3

∴ x=2 units and y=3 units

Ravi is 12 years younger than Surya

y - x = 12 yr

(3 – 2) unit = 12 yr

1 unit = 12 yr

Surya's age= 3 unit = 12 ×3 = 36 yr.

Surya's age after 9 yr = 36 + 9 = 45 yr.

50. If $\dfrac{2\tan^2 30°}{1-\tan^2 30°}$ + sec²45 ° − sec²0 ° = x sec 60 °, then the value of x is

    A. 2   B. 1

    C. 0   D. −1

Ans. B

Sol. $\dfrac{2\tan^2 30°}{1-\tan^2 30°}$ + sec²45 ° − sec²0 ° = x sec 60 °

$$\frac{2 \times \left(\frac{1}{\sqrt{3}}\right)^2}{1-\left(\frac{1}{\sqrt{3}}\right)^2} + \left(\sqrt{2}\right)^2 - 1 = 2x$$

$$\frac{2 \cdot \frac{1}{3}}{1-\frac{1}{3}} + 2 - 1 = 2x$$

1 + 2 − 1 = 2x

∴ x = 1

Hence, option B is correct.

51. A boat went downstream for 160 km and returned immediately. It took the boat 20 hr. to complete the round trip. If the speed of the river were twice as high, the trip to downstream and back would take 32 hours. What is the speed of boat in still water?

    A. 15km/hr.   B. 16km/hr.

    C. 14km/hr.   D. 18km/hr.

Ans. D

Sol.

Let speed of boat is S_B and speed of steam = S_S

Given that, $\dfrac{160}{S_B+S_S} + \dfrac{160}{S_B-S_S} = 20$

Or, $8\left[\dfrac{S_B-S_S+S_B+S_S}{S_B{}^2-S_S{}^2}\right] = 1$

$16S_B = S_B{}^2 - S_S{}^2$ ....(1)

By second condition,

$\dfrac{160}{S_B+2S_S} + \dfrac{160}{S_B-2S_S} = 32$

Or, $5\left[\dfrac{S_B-2S_S+S_B+2S_S}{S_B{}^2-4S_S{}^2}\right] = 1$

$10S_B = S_B{}^2 - 4S_S{}^2$ ....(2)

When we multiply eq^n (1) by 4 and subtract eq^n(2)

We have, $54S_B = 3S_B^2$

On solving we have, S_B = 18 km/hr

52. In a mixture of milk and water, the proportion of milk by weight was 80%. If, in a 180 gms mixture, 36 gms of pure milk is added, what would be the percentage of milk in the mixture formed?

A. 80%   B. 100%

C. 84%   D. 83.3%

Ans. D

Sol. Percentage of milk in the mixture formed

$= \dfrac{180 \times \frac{80}{100} + 36}{180 + 36} \times 100$

$= \dfrac{180}{216} \times 100 = \dfrac{500}{6} = 83.33\ \%$

53. Rabi and Pradip started a business investing Rs. 3000 and Rs. 6000 respectively. After 4 months, Rabi invested more Rs. 2000. And after some months of business started, Pradip added more Rs. 2000. At the end of 1 year, Rabi got Rs. 10400 out of the total profit Rs. 27600. After how many months did Pradip invest more Rs. 2000?

A. 4   B. 5

C. 3   D. 7

Ans. B

Sol. Rabi and Pradip started a business investing Rs. 3000 and Rs. 6000 respectively. After 4 months, Rabi invested more Rs. 2000.

And after some months of business started, Pradip added more Rs. 2000.

Let after x months, Pradip invested more Rs. 2000.

Equivalent capital of Rabi

= Rs. (3000 × 4) + (5000 × 8)

= Rs. 52000

And, equivalent capital of Pradip

= Rs. (6000 × x) + [8000 × (12 − x)]

= Rs. 6000x + 96000 − 8000x

= Rs. 96000 − 2000x

At the end of 1 year, Rabi got Rs. 10400 out of the total profit Rs. 27600.

So, share of Pradip = Rs. 27600 − 10400 = Rs. 17200

Then, the ratio of their shares;

Rabi : Pradip = 10400 : 17200 = 26 : 43

Now, we can write now,

52000/(96000 − 2000x) = 26/43

⇒ 2000/(96000 − 2000x) = 1/43

⇒ 96000 − 2000x = 86000

⇒ 2000x = 10000

⇒ x = 5

∴ After 5 months, Pradip invested more Rs. 2000.

54. A sells an article to B at 20% loss, B sells it to C at a profit of 12.5% and C sells it to D at 8% loss. If D buys it for ₹248.40, then what is the difference (in ₹) between the loss incurred by A and C?
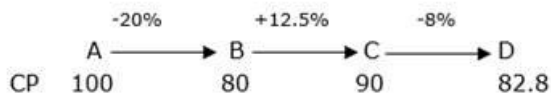
A. 36.80   B. 38.40

C. 42.60   D. 39.20

Ans. B

Sol.

Let CP for A = 100

82. 8 units $\rightarrow$ ₹248.40

1 unit $\rightarrow$ ₹3

Loss of A = 100-80 = 20 units

Loss of C = 90-82.8 = 7.2 units

difference between the loss incurred by A and C

= 20-7.2 = 12.8 units

12.8 unit = 12.8 × 3 = ₹38.40

55. If the ages of A and C are added to twice the age of B, the total becomes 59. If the ages of B and C are added to thrice the age of A, the total becomes 68 and if the age of A is added to thrice the age of B and thrice the age of C, the total becomes 108. What is the age of A?

A. 18 years   B. 15 years

C. 12 years   D. 20 years

Ans. C

Sol. A.T.Q.:

A + C + 2B = 59 ....(i)

3A + B + C = 68 ....(ii)

and A + 3B + 3C = 108 ....(iii)

From (ii)

⇒ B + C = 68 - 3A

From (iii)

A + 3(B + C) = 108

Putting value of (B+C):

⇒ A + 3(68 - 3A) = 108

⇒ 8A = 204 - 108

⇒ A = 96/8 = 12 years

56. Three plots having an area of 165, 195 and 285 square metres respectively are to be sub-divided into equalised flower beds. If the breadth of a bed is 3 metres, what will the maximum length of a bed?

A. 5.5 metres   B. 6 metres

C. 5 metres   D. 6.5 metres

Ans. C

Sol. Maximum area of a bed = HCF of 165, 195 and 285

∴ HCF = Maximum area = 15 sq. metres

Breadth = 3 metres

∴ Length $= \dfrac{15}{3} = 5\,\text{metres}$

57. A began business with ₹ 45000 and was joined after wards by *B* with ₹ 54000. After how many months did *B* join if the profits at the end of the year were divided in the ratio 2 : 1?

A. 4   B. 5

C. 6   D. 7

Ans. D

Sol. Let *B* remained in business for x months.

Ratio of equivalent capitals

= 45000 × 12 : 54000 × x = 10 : x

$\therefore \dfrac{10}{x} = \dfrac{2}{1}$

⇒ 2x = 10

⇒ x = 5

Clearly, *B* joined afer (12 − 5) = 7 months

58. If 324 × 289 = 35, 441 × 484 = 43, 625 × 400 = 45, find the value of 256 × 729.

A. 33   B. 35

C. 43   D. 34

Ans. C

Sol.

$324 \times 289 = 35$

$\sqrt{324} + \sqrt{289} = 18 + 17 = 35$

$441 \times 484 = 43$

$\sqrt{441} + \sqrt{484} = 21 + 22 = 43$

$625 \times 400 = 45$

$\sqrt{625} + \sqrt{400} = 25 + 20 = 45$

Similarly,

$$256 \times 729$$

$$\sqrt{256} + \sqrt{729} = 16 + 27 = 43$$

Hence, option C is the correct answer.

59. In a particular code system 'SAVING' is written as ' @ #?+!- ' and 'ONLY' is written as ' п!Δ|' .How is ' GOAL ' written in that code system ?

A. ? @ !Δ   B. !-п|

C. -п#Δ   D. Δ! @ п

Ans. C

Sol. According to Question , letter replacement is like

G-> -

O-> п

A->#

L->Δ

So 'GOAL' is written as -п#Δ

60. **Two statements are given, followed by four conclusions numbered I, II, III and IV. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.**

Statement:

No old are bold.

Some bold are mild.

Conclusions:

I. No bold are old.

II. Some mild are bold.

III. Some old are not bold.

IV. All old are not bold.

A. All conclusions follow.   B. Conclusion (I) and (IV) follow

C. Conclusion (I) and (II) follow   D. Only conclusion (I) follows

Ans. A

Sol.

Minimum Possible diagram is-

Conclusions:

I. No bold are old. (It follows as its obvious from the above diagram.)

II. At least some mild are not old. (It follows as its obvious from the above diagram.)

III. Some old are not bold. (It follows as its obvious from the above diagram.)

IV. All old are not bold. (It follows as its obvious from the above diagram.)

So, All conclusions follow.

Hence, option A is the correct answer.

61. A man travels 4 km due north, then travels 6 km due east and further travels 4 km due north. How far is he from the starting point?

A. 8 km
B. 10 km
C. 6 km
D. 14 km

Ans. B

Sol.

Required distance

$$AD = \sqrt{(DE)^2 + (AE)^2} = \sqrt{(8)^2 + (6)^2}$$

$$= \sqrt{64 + 36} = \sqrt{100} = 10\ km.$$

Hence, the correct option is (B).

62. Point P is 4m to the south of point Q. Point R is 12m to the west of point P. Point S is 2m to the north of point R. Point T is 12m to the east of point S. Point U is 4m to the south of point T.

In which direction is U with respect to Point R?

A. South
B. East
C. South-East
D. West

Ans. C

Sol.

Hence the correct option is (C).

63. **Which of the following diagrams indicates the best relation between fruits, Rasagulla and banana?**

A.

B.

C.

D.

Ans. A

Sol. Banana is one of the fruits while rasagulla is different from these. Therefore, option A. clearly indicates the relation between fruits, Rasagulla and Banana.
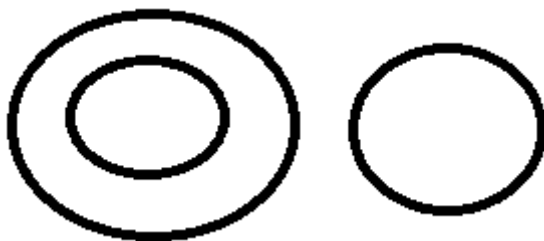
Hence, option A is the correct answer.

64. A man said to a lady, 'Your mother's husband's sister is my mother.' How is the man related to the lady?

A. Cousin   B. Brother

C. Son   D. Nephew

Ans. A

Sol. Lady's mother's husband is lady's father; whose sister is lady's aunt. Man is the son of lady's aunt, so man is the cousin of lady.

65. Arrange these letters of each group to make a meaningful word and then find the odd one out.

A. VIDEID	B. GHIET
C. VEENS	D. ORFU

Ans. A

Sol. VIDEDI → DIVIDE

GHIET → EIGHT

VEENS → SEVEN

ORFU → FOUR

So DIVIDE is the odd one

66. In the following question, select the related word pair from the given alternatives.

Pulp : Paper :: ? : ?

A. Wood : Table	B. Cloth : Shirt
C. Yarn : Fabric	D. Iron : Steel

Ans. C

Sol. As 'Pulp' is the raw material of 'Paper', in the same way 'Yarn' is the raw material for 'Fabric'.

Hence, option C is the correct answer.

67. K, L, M, N, O and P are six friends sitting around a circle facing towards the centre. P sits second to the right of L who is the immediate neighbour of O. M sits immediate right of P. K sits second to the right of P. N sits between L and P. Who sits 2nd to the left of M?

A. N	B. M
C. O	D. P

Ans. A

Sol. P sits second to the right of L who is the immediate neighbour of O.

There will be two cases,
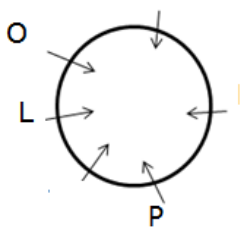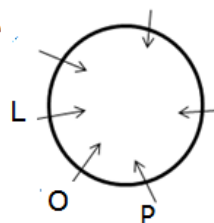
M sits immediate right of P
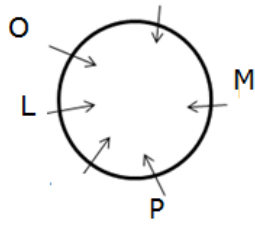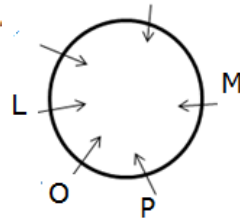
Case-1   Case-2

K sits second to the right of P.
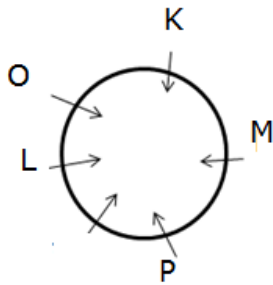
Case-1   Case-2
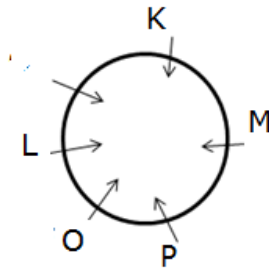
Now, N sits between L and P. From this statement case 2 will not follow.

Hence from case 1 the final arrangement will be,
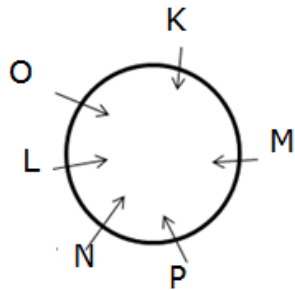
N sits 2nd to the left of M.

So correct answer is option A.

68. Identify the next term in the following series.

13, 40, 122, 369, ?

A. 1110   B. 1111

C. 1112   D. 1113

Ans. B

Sol. 13 x 3 + 1 = 40

40 x 3 + 2 = 122

122 x 3 + 3 = 369

369 x 3 + 4 = **1111**

Hence, option B is the correct response.

69. Common

    Direction: Study the following information carefully and answer the given question.

    Twelve people A, B, C, D, E, F, G, H, I, J, K and L live in a building with five floors. Each floor has 3 flats - flat 1, flat 2, and flat 3 in the same order from left to right. Ground floor is numbered floor 1 and topmost floor is floor 5. Each flat is built in such a way that Flat 1 of floor 2 is just above Flat 1 of floor 1 and so on.

    Three flats are vacant. The vacant flats are on odd number floors. Not more than one vacant flat is there on any floor. None of the vacant flat is Flat 3. B lives just above the vacant floor but not on Floor 2. A and C live just above the floor on which B lives. D lives on Flat 1 of Floor 1 while K lives on Flat 2 of Floor 2. A lives just above G. There is a gap of one flat between the vacant flat and L. K does not share floor with J or F. I lives on the floor on which one flat is vacant. C lives to the right of A. E does not live in the same flat number in which L lives. L and I live on different floors, but their flat numbers are same. F lives in the floor which is between the floors of J and H.

    End

    On which floor does E live?

    A. 1   B. 2

    C. 4   D. 5

    E. 3

Ans. B

Sol. From the direct statements, we get following table. The vacant flats are on Floor 1, 3 and 5 respectively. None of the vacant flat is Flat 3. So, either flat 1 or flat 2 will be vacant. B lives just above the vacant floor but not on Floor 2. So B will live on floor 4.

Now, we have two places for B (Flat 1 of Floor 4 or Flat 2 of Floor 4).

	Flat 1	Flat 2	Flat 3
Floor 5			
Floor 4	B		
Floor 3	---		
Floor 2		K	
Floor 1	D		

	Flat 1	Flat 2	Flat 3
Floor 5			
Floor 4		B	
Floor 3		---	
Floor 2		K	
Floor 1	D		

A and C live just above the floor on which B lives. A lives just above G. C lives to the right

of A.
So A and C will live on Floor 5.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	
Floor 3	...		
Floor 2		K	
Floor 1	D		

	Flat 1	Flat 2	Flat 3
Floor 5	A	—	C
Floor 4	G	B	
Floor 3		...	
Floor 2		K	
Floor 1	D		

There is a gap of one flat between the vacant flat and L. This condition is only possible in Case I. So we shall eliminate Case II.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	
Floor 3	...		L
Floor 2		K	
Floor 1	D		

I lives on the floor on which one flat is vacant. L and I live on different floors, but their flat numbers are same.
So I will live in Flat 3 of Floor 1. It shows that Flat 2 of Floor 1 is vacant.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	
Floor 3	...		L
Floor 2		K	
Floor 1	D	—	I

K does not share floor with J or F. F lives in the floor which is between the floors of J and H. So F will live on Floor 3 and J will live on Floor 4.
E does not live in the same flat number in which L lives. So E will live in Flat 1 of Floor 2 and H will live in Flat 3 of Floor 2.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	J
Floor 3	---	F	L
Floor 2	E	K	H
Floor 1	D	—	I

This is the final arrangement.

70. Who lives to the immediate right of the vacant flat on Floor 3?

A. D   B. G

C. F   D. A

E. E

Ans. C

Sol. From the direct statements, we get following table. The vacant flats are on Floor 1, 3 and
5 respectively. None of the vacant flat is Flat 3. So, either flat 1 or flat 2 will be vacant. B
lives just above the vacant floor but not on Floor 2. So B will live on floor 4.

Now, we have two places for B (Flat 1 of Floor 4 or Flat 2 of Floor 4).

	Flat 1	Flat 2	Flat 3
Floor 5			
Floor 4	B		
Floor 3	---		
Floor 2		K	
Floor 1	D		

	Flat 1	Flat 2	Flat 3
Floor 5			
Floor 4		B	
Floor 3		---	
Floor 2		K	
Floor 1	D		

A and C live just above the floor on which B lives. A lives just above G. C lives to the right
of A.

So A and C will live on Floor 5.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	
Floor 3	...		
Floor 2		K	
Floor 1	D		

	Flat 1	Flat 2	Flat 3
Floor 5	A	—	C
Floor 4	G	B	
Floor 3		...	
Floor 2		K	
Floor 1	D		

There is a gap of one flat between the vacant flat and L. This condition is only possible in Case I. So we shall eliminate Case II.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	
Floor 3	...		L
Floor 2		K	
Floor 1	D		

I lives on the floor on which one flat is vacant. L and I live on different floors, but their flat numbers are same.

So I will live in Flat 3 of Floor 1. It shows that Flat 2 of Floor 1 is vacant.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	
Floor 3	...		L
Floor 2		K	
Floor 1	D	—	I

K does not share floor with J or F. F lives in the floor which is between the floors of J and H. So F will live on Floor 3 and J will live on Floor 4.

E does not live in the same flat number in which L lives. So E will live in Flat 1 of Floor 2 and H will live in Flat 3 of Floor 2.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	J
Floor 3	---	F	L
Floor 2	E	K	H
Floor 1	D	—	I

This is the final arrangement.

71. Which of the following is incorrect?

   A. A—Flat 2—Floor 5   B. H—Flat 3—Floor 2

   C. L—Flat 3—Floor 3   D. I—Flat 2—Floor 4

   E. All are correct.

Ans. D

Sol. From the direct statements, we get following table. The vacant flats are on Floor 1, 3 and 5 respectively. None of the vacant flat is Flat 3. So, either flat 1 or flat 2 will be vacant. B lives just above the vacant floor but not on Floor 2. So B will live on floor 4.

Now, we have two places for B (Flat 1 of Floor 4 or Flat 2 of Floor 4).

	Flat 1	Flat 2	Flat 3
Floor 5			
Floor 4	B		
Floor 3	---		
Floor 2		K	
Floor 1	D		

	Flat 1	Flat 2	Flat 3
Floor 5			
Floor 4		B	
Floor 3		---	
Floor 2		K	
Floor 1	D		

A and C live just above the floor on which B lives. A lives just above G. C lives to the right of A.

So A and C will live on Floor 5.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	
Floor 3	...		
Floor 2		K	
Floor 1	D		

	Flat 1	Flat 2	Flat 3
Floor 5	A	—	C
Floor 4	G	B	
Floor 3		...	
Floor 2		K	
Floor 1	D		

There is a gap of one flat between the vacant flat and L. This condition is only possible in Case I. So we shall eliminate Case II.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	
Floor 3	...		L
Floor 2		K	
Floor 1	D		

I lives on the floor on which one flat is vacant. L and I live on different floors, but their flat numbers are same.

So I will live in Flat 3 of Floor 1. It shows that Flat 2 of Floor 1 is vacant.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	
Floor 3	...		L
Floor 2		K	
Floor 1	D	—	I

K does not share floor with J or F. F lives in the floor which is between the floors of J and H. So F will live on Floor 3 and J will live on Floor 4.

E does not live in the same flat number in which L lives. So E will live in Flat 1 of Floor 2 and H will live in Flat 3 of Floor 2.

	Flat 1	Flat 2	Flat 3
Floor 5	—	A	C
Floor 4	B	G	J
Floor 3	---	F	L
Floor 2	E	K	H
Floor 1	D	—	I

This is the final arrangement.

72. Six of my colleagues are sitting on the first row in this group photograph. Krishna is to the immediate left of Kumar and to the immediate right of Samy. Vaani is in between Sheela and Kumar. Sheela is at one of the extreme ends.Where is Saroj Sitting ?

    A. To the right of Samy
    B. To the left of Samy
    C. In between Samy and Krishna
    D. In between Vaani and Sheela

Ans. B

Sol.

Krishna is to the right of Samy.

There is no person between Samy and Krishna. There is no person between Vaani and Sheela and sheela is at one of the extreme ends.

So, Saroj is sitting to the left of Samy.

Hence, option B is the correct answer.

73. **Directions:** For each of the following questions there is some relationship between terms to the left of:: and the same exists between the two terms to its right in each these questions the fourth term is missing term is one of the alternatives among the five term given below. Find out this term. JTIS : HRGQ :: FPEO:?

    A. CNDM   B. CNDQ
    C. DNCM   D. DCNQ

Ans. C

Sol. There is a gap of one letter between each corresponding letters of JTIS' and HRGQ

74. A series is given, with one word missing. Choose the correct alternative from the given ones that will complete the series.

    trash, glider, sponsor, unipolar, ?

    A. fertilizer   B. reflector
    C. default   D. certify

Ans. B

Sol. Here, all words are arranged with increasing number of letters in each word.

Trash → 5 letters

Glider → 6 letters

Sponsor → 7 letters

Unipolar → 8 letters

Thus the next word should be of 9 letters.

Thus the next word in the series is 'Reflector'.

75. In the following question, some statements followed by some conclusions are given. Taking the given statements to be true even if they seem to be at variance from commonly known facts, read all the conclusions and then decide which of the given conclusions logically follows the given statements.

Statements:

a) Odisha is still an underdeveloped state.

b) Problems like poverty, unemployment and illiteracy have not been solved.

Conclusions:

I) The administration of Orissa is not sensitive enough.

II) It is the Will of God.

A. Only I follows   B. Only II follows

C. Both I and II follow   D. Neither I and II follows

Ans. D

Sol. Odisha is still an underdeveloped state. Problems like poverty, unemployment and illiteracy have not been solved in Odisha till now.

Apart from the administration, there can be many other factors of the poverty, unemployment and illiteracy issues. Hence Conclusion I is not true.

There is not any relation here with the will of God. Hence Conclusion II is also not true.

Hence, neither I and II follows

76. N is taller than T who is shorter than S. W is taller than B . I is shorter than V. Neither W nor V is the tallest. If S is standing second in decreasing order of height, who will stand in the middle of the group of these seven persons?

A. W   B. W or V

C. H or S   D. Can't be determined

Ans. D

Sol. Hence, Correct option is D.

77. Mr. Neerav Modi was born two years after his father's marriage. His mother is five years younger than his father but 20 years older than Mr. Modi who is 10 years old. At what age did his father get married?

A. 23 years   B. 25 years

C. 28 years   D. 30 years

Ans. A

Sol.   Neerav Modi's present age = 10 years.

His mother's present age = (10+20) years = 30 years.

Modi's father present age = (30+5) years = 35 years.

Modi's father's age at the time of Modi's birth = (35 - 10)years = 25 years.

Therefore, Modi's father's age at the time of marriage = (25 – 2) years = 23 years.

Hence, option A is the correct answer.

78.   Find the odd number/letters/word from the given alternatives.

A. Perception   B. Discernment

C. Penetration   D. Insinuation

Ans.   D

Sol.   First three out of given four have the same meaning only 'Insinuation' has the different meaning.

Hence, option D is correct.

79.   In a certain code, 'TEACHER' is written as VGCEJGT. How is 'CHILDREN' written in that code?

A. EJKNEGTP   B. EJKNFTGP

C. EJNFITP   D. EJKNFTGH

Ans.   B

Sol.   Each letter is shifted two ahead.

Hence CHILDREN would be: EJKNFTGP

Hence B

80.   **Four number-pairs have been given, out of which three are alike in some manner and one is different. Select the number-pair that is different from the rest.**

A. 5 : 27   B. 6 : 39

C. 7 : 51   D. 2 : 6

Ans.   B

Sol.

$$5^2 + 2 = 27$$

$$7^2 + 2 = 51$$

$$2^2 + 2 = 6$$

But,

$$6^2 + 2 = 38 \neq 39$$

Hence, option B is the correct answer.

81. **Select the set in which the numbers are related in the same way as are the numbers of the following set.**

    (5, 8, 89)

    A. (7, 10, 149)   B. (2, 5, 19)

    C. (3, 4, 7)   D. (6, 9, 60)

Ans. A

Sol.

In (5, 8, 89) –

$5 \times 8 = 40$ and $40 \times 2 + 9 = 89$

Similarly, in (7, 10, 149)

$7 \times 10 = 70$ & $70 \times 2 + 9 = 149$

Hence, option A is the correct answer.

82. **Directions:** In the following question, identify the diagram that best represents the relationship among classes given below.

    Carnivorous, Animals and Tigers

    A.

    B.

    C.

    D.

Ans. A

Sol.

Tigers are carnivores. Carnivores and herbivores are included in the class animals. carnivores are the animal that feeds on other animals.
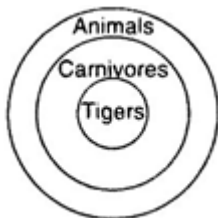
83. When Anil saw Manish, he recalled "he is the son of the father of my wife". Who is Manish to Anil?

    A. Brother-in-law   B. Brother

    C. Cousin   D. Uncle

Ans. A

Sol.
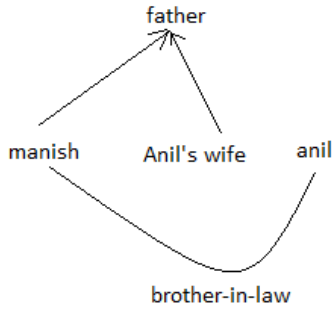
Anil's wife's father is a father to Manish also. Thus Anil's wife and Manish are brother and sisters. Wife's brother is a brother-in-law.

Hence, option A is the correct response.

84. Common **Direction:** Each of the questions below consists of a question and some statements are given below it. You have to decide whether the data provided in the statements are sufficient to answer the question. Read all the three statements and give answer: End

Six persons P, Q, R, S, U and V are sitting in a straight line facing north direction. What is the position of P from the left end?

I. R is 3rd from the left end and S is an immediate neighbor or R. U is not sitting at any end.

II. One person sit between R and U. U is not sitting at any end.

III. Q is an immediate neighbor of R. V is sitting at extreme right end and P is not an immediate neighbor of S.

A. Only I
B. Only II and III
C. Only I and III
D. I, II and III together are not sufficient
E. Only I and II

Ans. C

Sol.

From I,

	S	R			

Or

		R	S		

From, I and II,

	S	R		U	

Or

		R	S	U	

From II and III,

					V

Or

				V	

R position is not confirm and there are so many possibilities we can't find exact position of

P.

From I and III,

| P | Q | R | S | U | V |

So, From I and III we can find that P is sitting at extreme left end.

85. GEH FDI ECK ? CAR

A. DAN   B. DBN

C. DBM   D. CAM

Ans. B

Sol. The first and the second element of each group go one place backward in the alphabet. The third element follows +1, +2, +3, +4 ....

86. A carnot engine operates between $27°C$ and $327°C$. If the engine produces 300 kJ of work, what is the entropy change during heat rejection?

A. 0.5 kJ/K   B. 1 kJ/K

C. 1.5 kJ/K   D. 2 k/JK

Ans. B

Sol.

$$\frac{300}{Q_{in}} = \frac{600 - 300}{600}$$
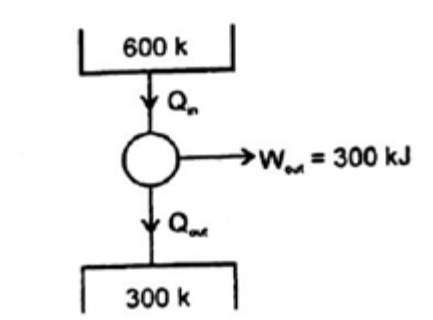
$Q_{in} = 600\,kJ$

$Q_{out} = 300\,kJ$

$(\Delta S)_{Rej} = \dfrac{300}{300} = 1\,kJ\,/\,K$

87. Feeler gauges are used for measuring the_____.

A. Thickness of metal sheet

B. Clearances between matting parts

C. Pitch of screw threads

D. Radius of curvature

Ans. B

Sol.

- Feeler gauges are a collection of thin sheets of different sizes used to measure clearance between various mating parts.

88. The value of critical load for the column when one end is fixed and other is hinged

   A. $\frac{\pi^2 EI}{4L^2}$

   B. $\frac{4\pi^2 EI}{L^2}$

   C. $\frac{2\pi^2 EI}{L^2}$

   D. $\frac{\pi^2 EI}{L^2}$

Ans. C

Sol. Euler's column formula is given by

$$F = \frac{\pi^2 EI}{L_e^2}$$

when one end fixed and other is hinged,

$$L_e = \frac{L}{\sqrt{2}}$$

$$\text{So, } F = \frac{2\pi^2 EI}{L^2}$$

89. Match **List-I** (Flow problem under study) with **List-II** (Model law) and select the correct answer using the codes given below the lists:

   List-I

   A) Rise of gas bubbles in liquid

   B) Flow of gas in a pipe

   C) Flow over a spillway dam

   D) Flight of supersonic jet

   List-II

   1) Euler number

   2) Froude number

   3) Mach number

   4) Reynolds number

   5) Weber number

   A. A-3 B-5 C-4 D-1

   B. A-5 B-2 C-4 D-3

   C. A-3 B-4 C-2 D-1

   D. A-5 B-4 C-2 D-3

Ans. D

Sol. (i) Rise of gas bubbles in liquid → Surface tension forces are predominant in comparison to other forces.

For Dynamic similarity, $[W_M=W_P]$

(ii) Flow of gas in a pipe → Viscous forces are predominant.

For Dynamic similarity, $[R_{em}=R_{ep}]$

(iii) Flow over a spillway dam = Froude number

(iv) Flight of supersonic jet →Elastic forces are predominant as compared to other forces.

For Dynamic similarity, $[M_M=M_P]$

90. Impact test is done to find _____.

    A. Ductility   B. Toughness

    C. Hardness   D. Fatigue resistence

Ans. B

Sol. Objective of impact test:

o   To find dynamic toughness of the given material.

o   To study notch sensitivity characteristics of the material.

o   To examine ductile to brittle transition behavior in material.

91. Two metallic plates of 5 mm thickness are being spot welded using 6 mm diameter electrode. The interface at contact has a resistance of 0.0012 ohm. A current of 1500 A is passed for 0.5 sec. The heat generated in welding process that results in welding is

    A. 1350 W sec   B. 2700 W sec

    C. 1500 W sec   D. 250 W sec

Ans. A

Sol. Given,

current $(I) = 1500\,A$

time $(t) = 0.5$ sec

Resistance $(R) = 0.0012$ ohm

heat generated $= I^2Rt = 1500^2 \times 0.0012 \times 0.5 = 1350$ W sec.

92. The slope of the stress-strain curve in the elastic deformation region is _____

    A. Elastic modulus   B. Plastic modulus

    C. Poisson's ratio   D. None of the mentioned

Ans. A

Sol. The elastic modulus is the ratio of stress and strain. So on the stress strain curve, it is the slope.

93. In P-system of inventory control

    A. order quantity remains constant

    B. time between ordering remains constant

    C. Recorder point remains constant

    D. production rate remains constant

Ans. B

Sol. Optional replenishment system: Inventory is reviewed on a fixed frequency and a specific quantity is ordered, if inventory is below a certain level. ... One-bin system: This is the P-system where one bin is reviewed at a fixed interval and inventory is brought up to a certain level.

94. Which of the following cutting process parameter has maximum effect on temperature generated in metal cutting_____?

A. Speed   B. Feed

C. Depth   D. Each parameter has same effect

Ans. A

Sol.

o   The cutting process parameters - speed, feed and depth of cut have considerable effect on the cutting temperatures generated.

o   Of these, cutting speed has the highest effect, since this controls the total energy input to the metal cutting operation.

o   The next influence is that of feed and the effect of depth of cut is the least of all.

95. In vibration isolation system, if $\omega/\omega_n < \sqrt{2}$, then for all values of damping factor, the transmissibility will be _____.

A. less than unity   B. equal to unity

C. greater than unity   D. zero

Ans. C

Sol. For underdamped systems the maximum amplitude of excitation has a definite value and it occurs at a frequency $\omega/\omega_n = 1$.

If $\omega/\omega_n < \sqrt{2}$, then for all values of damping factor, the transmissibility will be greater than unity.
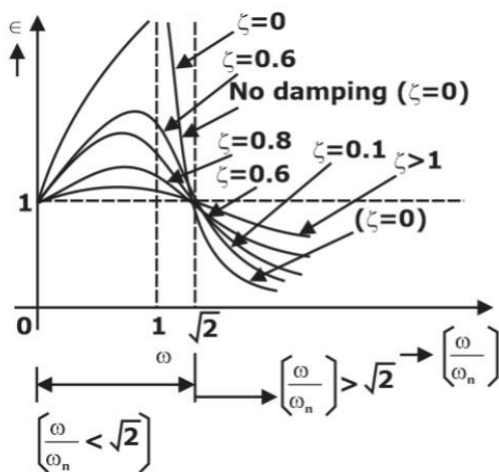
96. The discharge of hydrocarbons from petrol automobile exhaust is minimum when the vehicle is _____.

    A. Idling   B. Cruising

    C. Decelerating   D. None of these

Ans. B

Sol. **Cruising speed:** A speed for a particular vehicle, ship, or aircraft, usually somewhat below maximum, that is comfortable and economical because A/F ratio is stiochiometric at this speed so HC emissions are minimum at this speed.

97. The bending moment diagram of a cantilever beam subjected to bending moment at the end will be

    A. Triangle   B. Cubic parabola

    C. Parabola   D. Rectangle

Ans. D

Sol.

• The bending moment diagram of a cantilever beam subjected to bending moment at the free end will be a rectangle. Since there is no shear force acting throughout the length of the beam thus shear force diagram will be a straight line.

98. The governor will _____.

    A. work regularly in every cycle

    B. regulate speed by controlling fuel quantity

    C. not have any control on fuel working

    D. not good for fluctuating of energy output

Ans. B

Sol.

○ Governor control the fluctuation of speed which occurs due to variation in load over a period of time and works intermittently when load varies.

○ It regulates the speed by controlling quality or quantity of fuel as per load requirements.

○ It is essential for all types of engines as it adjusts the supply according to demand and has control over quality and quantity of working fuel.

99. Heat and work are_____.

    A. Path Function   B. Point Function

    C. Both (A) & (B)   D. None of these

Ans. A

Sol.

• **Path function:** Their magnitudes depend on the path followed during a process as well as the end states.

    Example : Work (W), heat (Q) are path functions.

- **Point Function:** They depend on the state only, and not on how a system reaches that state. All properties are point functions.

100. Which of the following statement(s) is (are) correct?

i. In a tensile test on a specimen, true stress in the specimen is less than the nominal stress.

ii. Stress is a fundamental behavior of the material.

iii. The amount of elastic deformation at a certain point, which a bar of mild steel undergoes at a given stress is the same irrespective of the stresses being tensile or compressive (nature).

A. i & ii   B. iii only

C. ii only   D. ii & iii

Ans. B

Sol. In tensile test, actual area is smaller than original area. Therefore, true stress will be more than nominal.

During experiment in laboratory, strain is measured that is why it is called fundamental quantity while stress is derived from strain.

The modulus of elasticity and Poisson's ratio are assumed to be the same in tension as well as compression.

101. The purpose of annealing is to

A. Induce stress   B. Harden the surface

C. Induce hardness   D. Remove stresses

Ans. D

Sol. The main purpose of annealing heat treatment is to soften the steel, regenerate overheated steel structures or just remove internal tensions.

102. A flat plate of 0.25 m^2 is pulled at 25 cm/sec relative to another plate, fixed at a distance of 0.05 cm from it with a fluid of viscosity 0.0015 N-s/m^2 separating them. The power required to maintain the motion is

A. 4.69 W   B. 0.0469 W

C. 0.1875 W   D. 1.875 W

Ans. B

Sol.

Power = Force x Velocity = $\mu A \left(\dfrac{du}{dy}\right) \times V$

Power = $0.0015 \times 0.25 \times \left(\dfrac{25}{0.05}\right) \times 25 \times 10^{-2} = 0.0469$ W

103. A body is subjected to completely reversed stress. The maximum stress is 30 Pa. What is the stress ratio?

A. 0   B. 1

C. -1   D. 2

Ans. C

Sol. Stress ratio is defined as the ratio of minimum stress to maximum stress.

For completely reversed bending stress has a lower limit and upper limit equal in magnitude but opposite in sign.

Thus,

the minimum stress is -30 MPa

$$\text{Stress ratio} = \frac{\sigma_{min}}{\sigma_{max}} = \frac{-30}{30} = -1$$

for completely reversed bending stress, stress ratio is always equals to -1.

104. An air washer can work as a

A. Filter only   B. Humidifier only

C. Dehumidifier only   D. All of the above

Ans. D

Sol. An air washer is a hybrid appliance, a combination of an air purifier and a humidifier. Like conventional humidifiers, air washers add therapeutic moisture to the air And like a conventional air purifier, an air washer removes symptom-triggering allergens from the air.

105. What type of boiler is a Velox boiler _____?

A. Forced circulation boiler

B. Natural circulation boiler

C. Positively forced circulation boiler

D. Once- through boiler

Ans. A

Sol.

o   Velox boiler is a fire tube boiler having forced circulation

o   It has gas turbine driven air compressor, which compresses the air.

o   Velox boilers are very flexible and capable of quick standing. Overall efficiency of the boiler unit is about 55-60%.

106. An oil tanker is partially filled and is then moved in translation at uniform acceleration. The free surface of oil then

A. Remains horizontal

B. Is inclined to horizontal with smaller depth at the rear end

C. Is inclined to horizontal with larger depth at the rear end

D. None of these

Ans. C

Sol. In this case the surface of constant pressure is a downward sloping plane surface. The free surface of the liquid is a surface of constant pressure, because the pressure at the free surface is equal to atmospheric pressure which is constant. As such under the effect of the

horizontal acceleration the free surface of the liquid will become a downward sloping inclined plane, with the liquid rising at the back end and the liquid falling at the front end.

107. Which law of thermodynamics will be violated, if the thermal efficiency of an engine becomes 100%?

A. Zeroth law
B. First law
C. Second law
D. Third law

Ans. C

Sol.

- 100% thermal efficiency of an engine means there is no heat rejection, whatever amount is supplied to the engine is converted into the work. It violates the second law of thermodynamics.

108. For Reheat cycle when compared to simple Rankine cycle, the dryness fraction at exhaust _____ and the condenser load _____.

A. Increases, Increases
B. Increases, Decreases
C. Decreases, Increases
D. Decreases, Decreases

Ans. A

Sol.
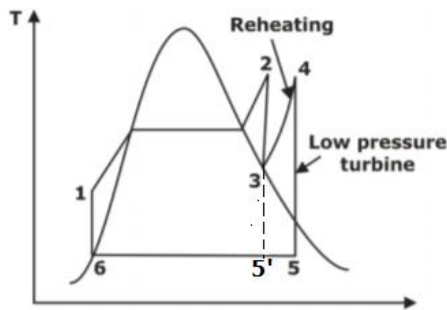
from the figure,

after the reheating, dryness fraction is x_5 which is greater than $x_{5'}$

and condenser load was $= h_{5'} - h_6$

after reheating $= h_5 - h_6$

which is also increased.

so the correct option will be A

109. During a rolling process, a plate of 30 mm thick is rolled down to 10 mm thickness by successive cold rolling passes using identical rolls of diameter 600 mm. (Assume no changes in width). If the coefficient of friction between work-piece & rolls is 0.1, then determine the minimum number of passes required.

A. 3
B. 4
C. 6
D. 7

Ans. D

Sol. Data: $h_1 = 30\,mm, h_2 = 10\,mm, D = 600\,mm, \mu = 0.1$

We know:

$\Delta h_{max/pass} = \mu^2 R$

$\therefore$ No. of Passes $= \dfrac{\Delta H_{total}}{\Delta H_{max/pass}} = \dfrac{20}{0.1^2 \times 300} = \dfrac{20}{3} \approx 7\,pass$

110. A specimen under fatigue loading is subjected to variable stresses ranging from −100 MPa to 150 MPa. Calculate the Amplitude Ratio.

   A. 1/5   B. 5

   C. 1/4   D. 4

Ans. B

Sol.

   $\sigma_{min} = -100$ MPa

   $\sigma_{max} = +150$ MPa

   σ_{max}

   $= \dfrac{\sigma_{max} + \sigma_{min}}{2} = \dfrac{150 - 100}{2} = 25$ MPa

   σ_V = stress Amplitude $= \dfrac{\sigma_{max} - \sigma_{min}}{2} = \dfrac{150 - (-100)}{2} = \dfrac{250}{2} = 125$ MPa

   $\therefore$ Amplitude Ratio $= \dfrac{\sigma_v}{\sigma_m} = \dfrac{125}{25} = 5$

111. Which one of the following relationships defines the Helmholtz function F?

   A. F = H + TS   B. F = H - TS

   C. F = U − TS   D. F = U + TV

Ans. C

Sol. By standard result, the Helmholtz function F is F = U − TS

112. A simply supported beam of length 4 m is with uniformly distributed load of 5 N/m. Find the maximum bending moment and point of contra flexure of the beam.

   A. 20 Nm, at the centre of beam

   B. 10 Nm, at the fixed end of beam

   C. 20 Nm, does not exist

   D. 10 Nm, does not exist

Ans. D

Sol. Maximum bending moment in a simply supported beam under uniformly distributed load is =

$$M = \frac{WL^2}{8} = \frac{5 \times 4^2}{8}$$

$$M = 10N - m$$

In this case, point of contraflexure (the point where Bending moment=0) doesn't exist.

113. A jet propulsion unit with Velocity of jet (V_j) 400 m/sec and velocity of vehicle(V_0) 200 m/sec. Find propulsive efficiency?

A. 50%   B. 66.66%

C. 33.33%   D. None of these

Ans. B

Sol. Given,

Velocity of jet (V_j) 400 m/sec

Velocity of vehicle(V_0) 200 m/sec.

$$Propulsive\ efficiency = \frac{2V_0}{V_0 + V_j}$$

$$= \frac{2 \times 200}{400 + 200}$$

$$= 66.66\%$$

114. PERT has following time estimate _____.

A. One time estimate   B. Two time estimate

C. Three time estimate   D. Four time estimate

Ans. C

Sol. PERT has three time estimates namely:

o   Optimistic time (t_o).

o   Pessimistic time (t_p).

o   Most likely time (t_m).

o $t_p > t_m > t_o$

115. Under certain cutting conditions, doubling the cutting speed reduces the tool life to $\left(\frac{1}{16}\right)^{th}$ of the original. Taylor's tool life index (n) for this tool-work piece combination will be _____.

A. 0.56   B. 0.35

C. 0.25   D. 0.65

Ans. C

Sol. Taylor's tool life equation is given by:

$VT^n = C$

$$V_1 T_1{}^n = 2V_1 \times \left(\frac{T_1}{16}\right)^n$$

$$\frac{1}{2} = \left(\frac{1}{2}\right)^{4n}$$

On comparison:

4n = 1

n = 0.25

116. A company sells a product for Rs.120 per piece. Fixed cost associated with the manufacturing is Rs. 12000 per month and the variable cost is Rs.60 per piece. Monthly sale needed to earn a profit of Rs.6000 per month is

A. 300   B. 200

C. 250   D. 350

Ans. A

Sol.

Let 'S' be the selling price per unit.

'V' be the variable cost per unit

'F' be the fixed cost per month

And 'P' be the profit.

Suppose 'x' units are to be solD.

Then, Sx = F + Vx + P

(S – V)x = F + P = 18000

x = 18000/(120 - 60) = 18000/60

x = 300 units

117. Which of the following 2-D incompressible velocity fields satisfies the conservation of mass.

A. u = x, v = y   B. u = -2x, v = 2y

C. u = xy, v = xy   D. u = $x^2 - y^2$, v = 0

Ans. B

Sol.

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} = 0 \Rightarrow -2 + 2 = 0$$

Option (B) satisfies

118. In kendall & Lee Representation a/b/c:d/e/f, where a & c represent_____?

A. probability distribution for service pattern and service rule

B. probability distribution for arrival pattern and service rule

C. probability distribution for arrival pattern and number of server

D. probability distribution for service pattern and number of server

Ans. C

Sol.

we know that,

a- Probability distribution for arrival pattern

b- Probability distribution for service pattern

c- Number of server

d- Service rule

e- Size of system

f- Size of calling population

119. Which of the following is an example of positive clutch?

A. Plate Clutch   B. Cone Clutch

C. Centrifugal Clutch   D. Jaw Clutch

Ans. D

Sol.

• The positive clutches are used when positive (no slip) drives are required.

• These clutches transmit power from the drive shaft to the driven shaft by the interlocking of jaws or teeth.

• They are rarely used as compared to friction clutch. E.g. jaw clutch, claw clutch, toothed clutch.

120. There is a refrigeration machine which have coefficient of performance equal to 1.5. It is used to remove heat at the rate of 1000 kJ/min. The power required for this machine is:

A. 10.23 kW   B. 12.50 kW

C. 11.11 kW   D. 14.15 kW

Ans. C

Sol. $COP = \dfrac{\text{Desired effect}}{\text{Work input}} = \dfrac{\text{Refrigeration Effect}}{\text{Work input}}$

$\Rightarrow$ Work input $= \dfrac{\text{Refrigeration Effect}}{COP} = \dfrac{1000}{1.5}$ kJ/min = 666.67 kJ/min = 11.11 kW

So, the correct option is (c).

121. Two circular mild steel bars A and B of equal lengths have diameters 2 cm and 3 cm respectively. Each is subjected to a tensile load of magnitude T. The ratio of elongations of the bars Δ_A/Δ_B is _____.

A. 2/3   B. 5/8

C. 9/4   D. 2/5

Ans. C

Sol. Given,

d_A = 2cm, d_B = 3cm

$L_A = L_B = L,$

$W_A = W_B = T$

Since:

$$\Delta = \frac{WL}{AE}$$

$$\therefore \quad \Delta_A = \frac{WL}{A_A E} \quad \& \quad \Delta_B = \frac{WL}{A_B E}$$

$$\therefore \quad \frac{\Delta_A}{\Delta_B} = \frac{\dfrac{WL}{A_A E}}{\dfrac{WL}{A_B E}} = \frac{A_B}{A_A} = \frac{\dfrac{\pi}{4} X D_B^2}{\dfrac{\pi}{4} X D_A^2} = \frac{3^2}{2^2} = \frac{9}{4}$$

122. Select the option, which correctly maps all the items in List A to their corresponding items present in List B:

List A	List B
A1: Surface tension	B1: $\frac{du}{dy}$ is constant
A2: Newtonian fluid	B2: Newton per meter
A3: Kinematic viscosity	B3: Poise
A4: Absolute viscosity	B4: $\frac{stress}{strain}$ is constant
	B5: Stokes

A. A1 - B1, A2 - B4, A3 - B5, A4 - B3

B. A1 - B2, A2 - B1, A3 - B5, A4 - B3

C. A1 - B2, A2 - B1, A3 - B3, A4 - B5

D. A1 - B1, A2 - B4, A3 - B3, A4 - B5

Ans. B

Sol.

List A	List B
A1: Surface tension	B2: Newton per meter
A2: Newtonian fluid	B1: $\frac{du}{dy}$ is constant
A3: Kinematic viscosity	B5: Stokes
A4: Absolute viscosity	B3: Poise

123. Consider a cyclic process in which different states have heat interaction of 8 KJ, -10 KJ and 5 KJ respectively. The change in internal energy is

A. 3 KJ   B. -3 KJ

C. 23 KJ   D. 0

Ans. D

Sol. As we know, Internal energy is a point function thus its cyclic integral is always equals to zero

Thus, for a cyclic process, change in internal energy, dU = 0

124. A shaft with torsional stiffness (q) has a disc of mass moment of inertia (I) attached at the end, then the natural frequency (f_n) of free torsional vibration of the shaft is given by:

A. $f_n = 2\pi \times \sqrt{qI}$

B. $f_n = \dfrac{1}{2\pi} \times \sqrt{\dfrac{1}{qI}}$

C. $f_n = \dfrac{1}{2\pi} \times \sqrt{\dfrac{q}{I}}$

D. $f_n = 2\pi \times \sqrt{\dfrac{q}{I}}$

Ans. C

Sol. Given,

Mass moment at Inertia = I

Torsional stiffness = q

Frequency of torsional vibration =

$$f_n = \dfrac{1}{2\pi} \times \sqrt{\dfrac{q}{I}}$$

125. Which of the following is a spring controlled governor?

A. Hartung governor

B. Wilson Hartnell governor

C. Pickering governor

D. All of these

Ans. D

Sol. Spring controlled governors are Hartnell, Hartung, Wilson Hartnell and Pickering governor. So, the correct option is (d).

126. A spring of stiffness 3kNm is initially stretched by 5cm. Later on the spring is further stretched by 10cm. What is the work done in stretching?

A. 30Nm

B. 60Nm

C. 45Nm

D. 75Nm

Ans. A

Sol.

Given,

k = 3kNm = 3000Nm

x_1 = 5cm, x_2 = 5+ 10 = 15cm

Work done = $W = \frac{1}{2}k(x_2^2 - x_1^2) = \frac{1}{2} \times 3000\left(\frac{15^2 - 5^2}{100^2}\right)$

W = 30Nm

127. A bar of copper and bar of steel form a composite system, which is heated to a temp of 40 ° C. The stress in steel bar is

A. Tensile   B. Compressive

C. Zero   D. Shear

Ans. A

Sol. Since, the beam is composite, and the **thermal coefficient of expansion** is **more for copper** as compared to steel. So, copper has the tendency to expand more but as they combine to each other that's why the copper will undergo compression and steel undergo the tensile stress and finally elongation of both the materials has to be same because of composite nature.

128. Moulds are made from special sand having specific properties so that defects do not occur. It is normally a mixture of

A. Sand and clay   B. Clay and water

C. Sand and water   D. Sand, clay and water

Ans. D

Sol. Moulding sand is a mixture of sand, clay and water and some additives. Clay and water acts as a binding agent and impart strength to sand.

129. Which of the following is a steam turbine?

A. De laval   B. Kaplan

C. Francis   D. Bulb

Ans. A

Sol. De Laval is a steam turbine.

Other turbines mentioned are all water turbines.

So option A is correct.

130. Which of the following fitting is a boiler mounting?

A. Superheater   B. Economizer

C. Feed check valve   D. feed pumps

Ans. C

Sol. Boiler mountings are necessary components so that a boiler works properly. Feed check valve is a boiler mounting used to regulate the flow of boiler feed water.

131. In a cooling tower, the minimum temperature to which water can be possibly cooled is known as

A. Dew point temperature of air

B. Wet bulb temperature of air

C. Dry bulb temperature of air

D. Ambient surrounding temperature

Ans. B

Sol. Dry bulb temperature (DBT):

Temp. of moist sir measured by a standard thermometer

Wet bulb temperature (WBT)

Temp. of moist sir measured by a thermometer covered with wetted wick or wet cloth.

Dew Point temperature (DPT):

If unsaturated moist air is cooled at constant pressure, then the temperature at which the moisture in the air begins to condense is known as dew-point temperature (DPT) of air.

132. For minimum work in a reciprocating compressor, the compression process should be _____

A. adiabatic   B. isothermal

C. isochoric   D. isobar

Ans. B

Sol.

- In reciprocating compressor,

  Compression work will be minmum when the process isothermal compression.
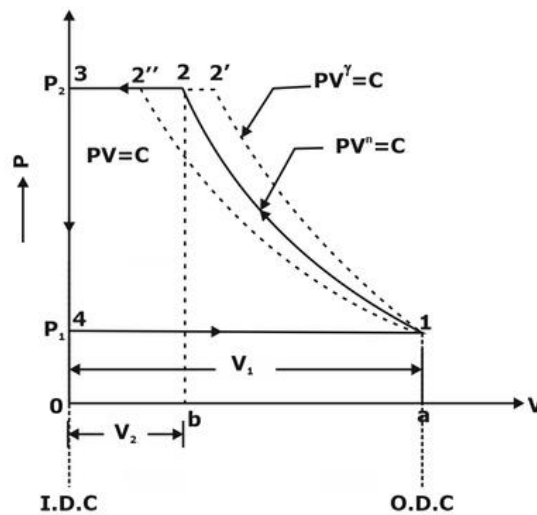
133. The number of radiation shield screens in case of radiation heat transfer to reduce the radiation heat exchange by 80% is _____.

A. 1   B. 2

C. 3   D. 4

Ans. D

Sol. Radiation heat transfer with 'n' shield screens:

$$(Q)_{n-shields} = \left(\frac{1}{n+1}\right)(Q)_{without \, shields}$$

Given: $Q_{with \, shields} = (1 - 0.80)Q_{without \, shields}$

$$0.20 \times Q_{without \, shields} = \left(\frac{1}{n+1}\right)Q_{without \, shields}$$

On solving: n = 4

134. In Brayton Cycle, the work ratio is 0.65. What is the back work ratio of this Brayton Cycle?

A. 2.53   B. 0.65

C. 0.35   D. 1.53

Ans. C

Sol.

For a Brayton Cycle:

Work ratio (r_w) + Back work ratio (r_{bw}) = 1

Therefore:

$r_{bw} = 1 - r_w = 1 - 0.65 = 0.35$

135. Mechanical efficiency is the ratio of_____.

A. brake power to heat input

B. indicated power to heat input

C. brake power to indicated power

D. friction loss to heat input

Ans. C

Sol. Mechanical efficiency is the ratio of brake power to indicated power.

i.e. BP/IP

136. A bullet fired at an angle of 30 ° with the horizontal hit the ground 3 km away. By adjusting its angle of projection, can one hope to hits a target 5 km away. Assume the muzzle speed to be same and the air resistance is negligible:

A. possible to hit a target 5 km away

B. not possible to hit a target 5 km away

C. prediction is not possible

D. none of the above

Ans. B

Sol. Range of the projectile is given by formula.

$$R = \frac{u^2 \sin 2\theta}{g}$$

[u is the velocity of bullet, θ is angle which the bullet make with horizontal at time t]

θ = 30°, R = 3km = 3000m.

$$3000 = \frac{u^2 \sin 60°}{g}$$

$$u^2 = \frac{6000g}{\sqrt{3}}$$

Let θ' is the angle of projection so that the range R' = 5 km.

$$R' = \frac{u^2 \sin 2\theta}{g}$$

$$5000 = \frac{6000g}{\sqrt{3}} \cdot \frac{\sin 2\theta'}{g}$$

$$\sin 2\theta' = \frac{5}{6}\sqrt{3}$$

$$\sin 2\theta' = 1.443$$

As sin of angle cannot be greater than one so it is not possible to hit the target 5km away.

Hence, option B is correct.

137. In EDM process, the electrode is submerged in

   A. dielectric fluid   B. abrasive slurry
   C. electrolytic solution   D. chemical reagents

Ans. A

Sol. In Electro-discharge machining process, the workpiece and the electrode are submerged in a dielectric fluid. The dielectric fluid has several main functions in the EDM process. It isolates the tool electrode from the workpiece electrode to achieve a high current density in the plasma channel.

138. Slope of constant pressure line on temperature entropy diagram is given by.

   A. $\dfrac{C_p}{T}$ B. $\dfrac{T}{C_p}$

   C. $\dfrac{C_v}{T}$ D. $\dfrac{T}{C_v}$

Ans. B

Sol. From Tds equation

   Tds = dh – Vdp

For constant pressure process

$dp = 0$

$Tds = C_p dT$

$Slope = \dfrac{dT}{ds} = \dfrac{T}{C_p}$

139. An engine is required 150 kW brake power. The mechanical efficiency of the engine is 75%. The frictional power is

A. 150 kW
B. 200 kW

C. 50 kW
D. 25 kW

Ans. C

Sol. Frictional power (FP) is

FP = IP − BP

$\eta_{mech} = \dfrac{BP}{IP}$

$IP = \dfrac{150}{0.75} = 200$ kW

FP = 200 − 150 = 50kW

140. A moving block having mass m, collides with another stationary block having mass 4m. The lighter block comes to rest after collision. When the initial velocity of the lighter block is v, then the value of coefficient of resistitution (e) will be :-

A. 0.5
B. 0.25

C. 0.8
D. 0.4

Ans. B

Sol. Let us assume that after the collision velocity of the heavier block is v'.

By conservation of linear momentum

$mv = 4mv'$

$v' = \dfrac{v}{4}$

Coefficient of restitution (e) = $\dfrac{\text{Velocity of seperation}}{\text{Velocity of approach}}$

$e = \dfrac{\dfrac{v}{4} - 0}{v - 0}$

$e = \dfrac{1}{4} = 0.25$

141. In an ideal vapour compression refrigeration cycle, the enthalpy of the refrigrator before and after the evaporator are respectively 200 kJ/kg and 300 kJ/kg. The circulation rate of the refrigerant (in kg/min) for each 200 kJ/min of refrigeration is

A. 1   B. 2

C. 3   D. 4

Ans. B

Sol. Given,

Ideal vapour compression refrigeration cycle,

Enthalpy of the refrigrator before evaporator h_4 = 200 kJ/kg

Enthalpy of the refrigrator after evaporator h_1 = 300 kJ/kg

Refrigeration Capacity = 200 kJ/min

Refrigeration Effect , Q = h_1 - h_4 = 300 -200 = 100kJ/kg

Refrigeration Capacity = mass × Refrigeration Effect

$$m = \frac{Q}{h_1 - h_4} = \frac{200}{300 - 200} = 2kg/min$$

142. The degree of freedom of the linkage shown in the figure is

A. 1   B. 2

C. 0   D. 3

Ans. B

Sol.

Given,

n = number of links = 7

j = number of binary joints = 8

Degree of freedom (F) is given by,

$F = 3(n-1) - 2j - h - F_r$

h = number of higher pairs = 0

$F_r = number\ of\ redundant\ links = 0$

Substituting the values

F = 3 X 6 – 2 X 8 -0 -0 = 2

143. As the heat transfer coefficient increases

    A. Effectiveness of fin increases

    B. Effectiveness of fin decreases

    C. Efficiency of fin increases

    D. Both effectiveness & efficiency of fin increases

Ans. B

Sol.

$$\epsilon_{fin} \propto \frac{1}{\sqrt{h}} \ \& \ \eta_{fin} \propto \frac{1}{\sqrt{h}}$$

∴as the 'h' increases both efficiency & effectiveness of fin decreases

144. What is the efficiency of jet for a nozzle of 100 mm delivering a stream of water at 20 m/s perpendicular to a plate that moves away from jet at 10 m/s.

    A. 50%   B. 25%

    C. 60%   D. 75%

Ans. B

Sol.

$$a = \frac{\pi}{4} \times 0.1^2 = 7.85 \times 10^{-3} m^2$$

$$F_x = \rho a (V - U)^2 = 10^3 \times 7.85 \times 10^3 \times [20 - 10]^2 = 785 \, N$$

Work done by the Jet = $F_x \times U$ = 785 × 10 = 7850 Nm/s

η of jet = $\dfrac{\text{Output of Jet}}{\text{Input of Jet}}$

$= \dfrac{\text{Workdone /s}}{\text{K.E of Jet /s}}$

$= \dfrac{F_x \times U}{\frac{1}{2}\rho a v^3}$

$= \dfrac{7850}{\frac{1}{2} \times 10^3 \times 7.85 \times 10^{-3} \times 20^3} = 0.2498$

= 25%

145. Two cars P and Q start from a point at the same time in a straight line and their positions are represented by $x_P(t) = at + bt^2$ and $x_Q(t) = ft - t^2$. At what time do the cars have the same velocity?

A. $\dfrac{a-f}{1+b}$

B. $\dfrac{a+f}{2(b-1)}$

C. $\dfrac{a+f}{2(b+1)}$

D. $\dfrac{f-a}{2(1+b)}$

Ans. D

Sol. Given that $x_p(t) = at + bt^2$

Differentiating both side with respect to t

$V_P = \dfrac{dx_p(t)}{dt} = a + 2bt$

and $V_Q = \dfrac{dx_Q(t)}{dt} = f - 2t$

it is given that $V_P = V_Q$

$\Rightarrow a + 2bt = f - 2t$

$\Rightarrow t = \dfrac{f-a}{2(b+1)}$

146. The unit of thermal diffusivity is

A. $m^2/hr\text{-}K$

B. $kcal/m^2\text{-}hr$

C. m^2/hr

D. $m/hr\text{-}K$

Ans. C

Sol. The quantity $a = k/pc$ is called thermal diffusivity.

$$a = \dfrac{K}{\rho C} = \dfrac{\dfrac{W}{m-K}}{\dfrac{kg}{m^3} \times \dfrac{J}{kg-K}} = \dfrac{\dfrac{J}{s} - m^2}{J} = \dfrac{m^2}{s} = \dfrac{m^2}{hr}$$

147. The order cost per order of an inventory is Rs. 400 with an annual carrying cost of Rs. 10 per unit. The Economic Order Quantity (EOQ) for an annual demand of 2000 units is

A. 400

B. 440

C. 480

D. 500

Ans. A

Sol. Given,

Annual demand = 2000 unit/order

Order cost per order = 400 Rs/order ,

Carrying cost = 10 Rs/ unit/year

$$EOQ = \sqrt{\dfrac{2DC_0}{C_h}}$$

$$= \sqrt{\dfrac{2 \times 2000 \times 400}{10}}$$

$$= 400 \ units$$

148. The COP of a cascade refrigeration system is_____
where $(COP)_1$ represents the COP of 1st refrigeration system and $(COP)_2$ represents COP of 2nd refrigeration system.

A. $\dfrac{(COP)_1 \times (COP)_2}{1 + (COP)_1 + (COP)_2}$

B. $\dfrac{1 + (COP)_1 + (COP)_2}{(COP)_1 \times (COP)_2}$

C. $\dfrac{(COP)_1 \times (COP)_2}{(COP)_1 + (COP)_2}$

D. $\dfrac{(COP)_1 \times (COP)_2}{1 - (COP)_1 + (COP)_2}$

Ans. A

Sol. COP of a cascade refrigeration sysem is $\dfrac{(COP)_1 \times (COP)_2}{1 + (COP)_1 + (COP)_2}$.

So, the correct option is (a).

149. Keeping other parameters constant, the brake power of diesel engine can be increased by?

A. Increasing the temperature of intake air

B. Decreasing the density in intake air

C. Decreasing the pressure of intake air

D. Increasing the pressure of intake air

Ans. D

Sol. Brake power of diesel engine can be increased by supplying air at higher pressure , this pressure boosting device is supercharger.

150. The time by which the activity completion time can be delayed without affecting the start of succeeding activities, is known as

A. Duration

B. Total Float

C. Free Float

D. Interfering Float

Ans. C

Sol.

- Free Float is the time by which the activity completion time can be delayed without affecting the earliest start of succeeding activities.

151. Lewis number is a dimensionless number defined as the ratio of

A. Momentum diffusivity to mass diffusivity

B. Momentum diffusivity to thermal diffusivity

C. Thermal conductivity to electrical conductivity

D. Thermal diffusivity to mass diffusivity

Ans. D

Sol.

$$\text{Schmidt number} = \frac{\text{Momentum diffusivity}}{\text{Mass diffusivity}}$$

$$\text{Prandtl number} = \frac{\text{Momentum diffusivity}}{\text{Thermal diffusivity}}$$

$$\text{Lorenz number} = \frac{\text{Thermal conductivity}}{\text{Electrical conductivity}}$$

$$\text{Lewis number} = \frac{\text{Thermal diffusivity}}{\text{Mass diffusivity}}$$

So, the correct option is (d).

152. Which of the following methods are used to increase efficiency of a Brayton cycle?

    A. Regeneration   B. Increasing pressure ratio

    C. Heat exchanger   D. All of the mentioned

Ans. D

Sol.

- A heat exchanger that acts as a counter-flow energy recovery device positioned within the supply and exhaust air streams of an air handling system, in order to recover the waste heat.

153. Which of the following forces take part for metal transfer in arc welding process?

    1) Gravity

    2) Surface Tension

    3) Electromagnetic interaction

    4) Drag Force

    A. 1 and 2   B. 1,3 and 4

    C. 2,3 and 4   D. 1,2,3 and 4

Ans. D

Sol. Gravity acts as detaching force, the metal drop is retained on the tip of electrode due to surface tension and Electromagnetic interaction maintains a repelling atmosphere to detach only molten metal and drag forces are introduced due to the flow of gases and detaches the droplet from tip of electrode.

154. A particle moves from a point(-2i+5j) to (4j+3k) when a force of (4 i+3j) N is applied. How much work has been done by the force?

    A. 8 J   B. 11 J

    C. 5 J   D. 2 J

Ans. C

Sol. Position vectors of the particles are

    $r_1 = (-2\hat{i} + 5\hat{j})$ and $r_2 = (4\hat{j} + 3k)$

    $\therefore$ Displacement of the particle,

$\triangle s = r_2 - r_1$

$= 4j + 3k - (-2\hat{i} + 5\hat{j})$

$= 2i - j + 3k$

Force on the particle, $F = 4i + 3j$ N

$\therefore$ Work done, $W = F . \triangle s$

$= (4i + 3j) . (2i - j + 3k)$

$= 8 - 3 = 5J$

155. Which one of the following is not possible in a closed cycle?

A. $\oint \dfrac{dQ}{T} = 0$

B. $\oint \dfrac{dQ}{T} < 0$

C. $\oint \dfrac{dQ}{T} > 0$

D. All of the above are possible, depending upon the cycle.

Ans. C

Sol. If,

$\oint \dfrac{dQ}{T} = 0$, cycle is reversible

$\oint \dfrac{dQ}{T} < 0$, cycle irreversible

$\oint \dfrac{dQ}{T} > 0$, cycle is impossible, since it violates the second law.

156. For diesel engine, the method of governing employed is

A. Quality governing

B. Quantity governing

C. Hit and miss governing

D. None of the above

Ans. A

Sol. In quality governing, the air flow rate remain constant but the composition of the mixture is changed by admitting more or less fuel in accordance in variation with load. The quality governing is mostly used in high speed diesel engine.

157. In cold storage plant, the refrigerant used is

A. R-11   B. R22

C. NH_3 D. Air

Ans. C

Sol. Some refrigerent and their applications

R-11 used in central conditioning,

R-22 window air conditioner,

NH_3 - used in cold storage plant,

Air is used in aircraft refrigeration

158. In beam of rectangular cross-section, the ratio of the maximum transverse shear stress to average shear stress at a section is_____.

   A. 2:1　　　　　　　　　　　　　　B. 3:1

   C. 3:2　　　　　　　　　　　　　　D. 4:3

Ans.　C

Sol.　For rectangular cross section,

The resistance offered by the internal stress to shear is known as shearing stress. Shearing stress is zero at extreme fibres of the beam. The bending stresses are maximum at extreme fibres of the beam cross section. Maximum shear stress is 1.5 times that of average shear stress.

$$\frac{\tau_{max}}{\tau_{avg}} = \frac{3}{2}$$

159. The bending stress is zero at

   A. Top fibre

   B. Bottom fibre

   C. Neutral axis

   D. Between top fibre and neutral axis

Ans.　C

Sol.

From bending equation, $bending\ stress, \sigma = \frac{My}{I}$

Where,

M = bending moment

y = distance from the neutral axis

I = moment of inertia

So, at y = 0, bending stress will be zero.

160. At the principal planes _____.

   A. the normal stress is maximum or minimum and the shear stress is zero

   B. the tensile and compressive stresses are zero

   C. the tensile stress is zero and the shear stress is maximum

   D. no stress acts

Ans.　A

Sol.

$$\tan 2\theta_{\tau-max} = -\left(\frac{\sigma_x - \sigma_y}{2\tau_{xy}}\right)$$

$$\tau_{max} = \sqrt{\left(\frac{\sigma_x - \sigma_y}{2}\right)^2 + \tau_{xy}^2}$$

When shear stress=0

$$\tau_{max} = \frac{|\sigma_x - \sigma_y|}{2}$$

Hence (A) is correct.

161. The boundary layer thickness at a distance X_1 from leading edge of plate is 5 mm when a fluid flows past a flat very long plate. If boundary layer is laminar then boundary layer thickness at distance $9X_1$ from leading edge will be

A. 15 mm
B. 45 mm

C. 5 mm
D. 9 mm

Ans. A

Sol.

In laminar boundary layer

$$\frac{\delta_1}{\delta_2} = \sqrt{\frac{X_1}{X_2}}$$

$$\delta_2 = \delta_1 \times \sqrt{\frac{X_2}{X_1}}$$

$$\delta_2 = 5 \times \sqrt{\frac{9X_1}{X_1}} = 15 \text{ mm}$$

162. In an arc welding process, the open circuit voltage is 200 V and the short circuit current is 2000 A, if the power characteristics of I-V are linear. The transformer current is 1200 A, then find the transformer voltage in volts.

A. 100
B. 80

C. 20
D. 60

Ans. B

Sol. Given $V_o = 200\,V$, $I_s = 2000\,A$, and $I = 1200\,A$

For linear characteristics

$$\frac{V}{V_o} + \frac{I}{I_s} = 1$$

$$\frac{V}{200} + \frac{1200}{2000} = 1$$

$$\frac{V}{200} = 0.4$$

$$V = 80 \; Volt$$

163. Sensitiveness of a governor is the ratio of

    A. Range of speed / Mean speed

    B. Maximum speed / Minimum speed

    C. Mean speed / Range of speed

    D. Governor effort / Range of speed

Ans. A

Sol.

Sensitiveness of governor

$$= \frac{\text{Max. change in speed}}{\text{Mean speed}}$$

$$= \frac{N_1 - N_2}{\frac{N_1 + N_2}{2}} = \frac{2(N_1 - N_2)}{N_1 + N_2}$$

164. Which one of the following is used to measure the heat transfer size of the heat exchanger?

    A. Effectiveness

    B. NTU

    C. LMTD

    D. Overall heat transfer coefficient

Ans. B

Sol. No. of transfer units (NTU) is used to measure the heat transfer size of the heat exchanger and mathematically,

$$NTU = \frac{UA}{C_{min}}$$

165. Which of the following is the function of chaplet in a sand mould?

    A. Support the mould from breaking

    B. Support the core during the pouring of molten metal.

    C. Support the mould from moving mould walls

    D. Prevent the formation of cold shuts.

Ans. B

Sol.

o   Chaplets are used to support the core.

o   Chaplets are of Same materials as that of casting.

166. The designation of steel as per the BIS standard is Fe300. Here 300 represents

   A. The minimum tensile strength in thousands of psi

   B. The maximum tensile strength in thousands of psi

   C. The minimum yield strength in thousands of psi

   D. The maximum yield strength in thousands of psi

Ans. A

Sol. Maraging steels tend to be described by a number (200, 250, 300 or 350), which indicates the approximate nominal tensile strength in thousands of pounds per square inch

167. Both hardness and brittleness are reduced by _____.

   A. Martempering   B. Austempering

   C. Tempering   D. None of these

Ans. C

Sol. **Tempering** is a heat treatment technique applied to ferrous alloys, such as steel or cast iron, to achieve greater toughness by decreasing the hardness of the alloy. It is done:

o   to relive residual stress

o   to improve ductility

o   to improve toughness.

168. Permanent deformation of material with respect to time due to constant load and variable temperature is known as _____.

   A. Elasticity   B. Isotropy

   C. Hardness   D. Creep

Ans. D

Sol.

o   Creep may be defined as a time-dependent permanent deformation at elevated temperature and constant stress.

o   Creep deformation occurs due to grain-boundary sliding, the more grain boundary area, the easier creep deformation will be. Thus, Creep deformation and creep strength are a grain-size sensitive property.

169. Stress concentration in static loading is

   A. very serious in brittle materials and less serious in ductile materials

   B. very serious in ductile materials and less serious in brittle materials

   C. equally serious in both types of materials

   D. seriousness would depend on other factors

Ans. A

Sol. Stress concentration in static loading is very serious in brittle materials and less serious in ductile materials

170. In free expansion process _____.

A. $W_{1-2} = 0$ B. $Q_{1-2} = 0$

C. $dU = 0$ D. All of the above

Ans. D

Sol. **Free expansion:**

o   In a free expansion, gas is allowed to expand into a vacuum. This happens so quickly, that there is no heat transferred in the process.

o   No work is done, because the gas does not work against anything.

o   According to the first law, this means that: $dU = 0$. Thus, there is no change in internal energy, so the temperature also stays the same.

****

Vision 2022
A Course for ESE & GATE Mechanical Aspirants

Why take this course?

> Complete Coverage of ESE 2022 Prelims & Mains Syllabus

> Complete Coverage of GATE 2022 Syllabus

> Both Objective & Conventional Approach

> Live Classes, Study Notes, Quizzes & Mock Tests